FOSSILS

ARRANGED

ACCORDING TO THEIR

OBVIOUS CHARACTERS;

WITH THEIR

HISTORY AND DESCRIPTION;

UNDER THE ARTICLES OF

FORM, HARDNESS, WEIGHT, || SURFACE, COLOUR, AND QUALITIES;

The PLACE of their PRODUCTION,

THEIR USES,

AND

Diſtinctive ENGLISH, and Claſſical LATIN NAMES.

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M.DCC.LXXI.

INTRODUCTION.

THE purpoſe here is to lay down an arrangement of Foſſils; founded on their obvious characters, and ſenſible qualities: according to which they may be known, and diſpoſed in method; without the ſkill of Chemiſtry, or the fatigue of experiments: without furnaces, or aqua fortis.

Thoſe arts and inſtruments may be needful to aſcertain their nature; but we are here employed only on their outward form, and character: the other part of the ſcience, which is indeed the moſt eſſential, will follow the more eaſily: for things, before they are deeply examined, ought firſt to be known.

In this method nothing will be admitted as an article of diſtinction, but what is to be perceived at once, by the ſight, ſmell, taſte, or touch. Good ſenſe alone will be required to arrange Foſſils according to theſe palpable and unerring guides; and the ſyſtem will ſerve for all cabi-

nets; becauſe it comprehends all the Foſſils that are known to exiſt.

From theſe determinations alone of our ſenſes, will be given a detail of the differences we find in Foſſils; under the heads of Form, Hardneſs, Weight, Surface, Colour, and Qualities, as diſtinguiſhed by the taſte, ſmell, or touch.

Theſe diſtinctive marks will be diſpoſed ſeparately in ſo many columns; and to theſe will be added two more for the hiſtory of the bodies: comprehending the place where they are found; and uſes to which they ſerve.

Thus the few words in our ſix firſt columns read together, will give the *Specific Character* of every Foſſil: and thoſe of the two laſt will add what is eſſential in its hiſtory and value.

A Table of Claſſes will be prefixed to all; in which the method will appear at one View.

The diſtinction of each Claſs will be added at the head of each: and after this, ſubordinate characters of the ſeveral genera. Theſe, like the reſt, will be founded only on obvious characters; and from theſe the detail of ſpecies will be regularly purſued.

Theſe

Theſe Characters cannot be ſo abſolute and determinate, as thoſe which mark the like great diſtinctions among Animals and Vegetables. It is impoſſible they ſhould: Foſſils, not being organic bodies, produced by eggs or ſeeds, are not themſelves ſo determinate and diſtinct: and it would be prepoſterous to attempt in the diſtribution, what nature has not done in their conſtruction.

The greater diſtinctions are the neareſt being abſolute; for ſo much the ſimplicity of nature in theſe bodies allows: all ſubordinate differences are leſs determinate; and the lower we deſcend, the more equivocal muſt be the marks. The Characters of Genera therefore are liable to exception often; and thoſe of what we are content to call Species, in this Kingdom, always.

The great and eſſential difference of Species and Variety, ſo uſeful in Plants, is loſt in Foſſils; it would be happy if it were otherwiſe: but 'tis idle to ſpeak of things any way but as they are.

The terms of difference between Species and Species, are every where expreſſed at the heads of the ſeveral columns; and theſe are all placed in each Page, becauſe uſually moſt of them are requiſite; though 'tis according

to

to the general nature of the bodies, that one or other of them becomes moſt eſſential: each Claſs has its different qualities, that more or leſs determine the Species of the objects it comprehends; and in this way all the marks are always ready.

Thus in *Stones*, the Characters of FORM, HARDNESS, WEIGHT, and SURFACE, are moſt eſſential; among the *Cryſtals* and *Spars*, FORM and COLOUR; with *Earths* and with the *Talcs*, FATTINESS; in the *Salts*, TASTE; and with the *Sulphurs*, SMELL. The terms of place belong to all; and (where they have been brought to ſerve the purpoſe of Life,) their uſes.

In the application of theſe terms to the ſeveral Foſſils, they are always given comparatively; and have reference to the other Bodies of the ſame Genus. The Claſſes ſeparate very different things from one another; and the leſſer diſtinction of Genus yet farther divides theſe of each alliance: the Character of the Claſs, and that of the Genus, are always to be carried in the mind, in addition to the diſtinctive mark of the Species: and as the articles expreſſed in our columns are intended to refer only to the Foſſils of the ſame name, when 'tis ſaid that bodies are hard, or ſoft, light, or heavy, it means nothing abſolute; but is only to be under-

underſtood as hard, or ſoft, in compariſon of others of that kind: and ſo of all the reſt.

In the ſame manner the article of place is not meant as ſingular, or particular; for many Foſſils are in a manner univerſal: 'tis only intended to ſay, that ſuch or ſuch a Country is one of thoſe where this or that Foſſil is found.

With reſpect to other Authors, their ſyſtems have been founded on principles ſo different from thoſe which direct all things in this, that references to them are not very neceſſary: the information intended to be given here, is meant to be conveyed at once; and to be itſelf ſufficient for the diſtinctive knowledge of the body. However, to comply with cuſtom; and mark the way to farther enquiry, the name of the Author, who ſeems to have beſt underſtood the body in queſtion, is annexed always to its Latin name, by the initial letter. The Reader will be pleaſed therefore to know, that in theſe places,

W ſtands for Wallerius.
B for Bomare.
L for Linnæus.
H for my hiſtory of Foſſils.

And that where the letter N is added, the Body deſcribed is a new Species.

As

As I have had the advantage of more than twenty years experience ſince the publication of the Book juſt named; I find I ſhall have many Species to add, which were not known at all at that time; and ſeveral to retrench, which are better known now: and where the ſame faithful guide directs me, I ſhall not ſcruple to take the ſame liberty with the opinions of others, as to the Species; that I have taken with my own.

Large Hiſtories may be written on the nature of the ſeveral ſubjects; but the purpoſe here is nothing more than that previous acquaintance with the Bodies, which is the firſt eſſential enquiry: the plan is to make that as certain, as obvious, and as familiar, as the nature of the ſubject will admit: and of all things, to expreſs it in as few words as poſſible.

The annexed table will give the courſe of the arrangement that is to be uſed: in which, it ſeems eſſential to begin with the ſimpleſt bodies: for otherwiſe, 'tis impoſſible to comprehend the deſcription of thoſe which are compoſed of ſeveral kinds.

NATIVE

NATIVE FOSSILS.

CLASS I.

TALC.

TALCUM.

A pure Fossil: composed of flexible and elastic Plates.

TALC is LIABLE TO BE tinged by mineral Steams;
clouded by subterranean Fires;
fouled by admixture of earths;
broken by the force it suffered while among fluid Matter;
distorted by the concretion of Stones, in which it lies;
debas'd by an admixture of their Matter;
and intermixed with similar Fossils.

Hence, tho' naturally transparent, it becomes sometimes opake; alters its form; and loses in like manner of its flexibility.

Therefore Talc, in the condition we see it in the earth, is to be separated into various Genera, and Species; according to those differences, and other accidents.

T A L C.

G E N U S I.

I S I N G L A S S.

V I T R U M.

Compoſed of broad, flat, cloſe, poliſhed Plates.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. MUSCOVY ISINGLASS.							Mica Membranacea. W.
In broad masses	the plates flexible	very light	glossy	BROWNISH	soft	Russia, in rocks	for windows, lanterns, &c.
2. DANISH ISINGLASS.							Mica Laminosa. L.
Large thick masses	plates tough	heavy	shining	WHITISH	fatty	Denmark, Sweden, Norway	windows.
3. INDIAN ISINGLASS.							Verre de Muscovie jaune. B.
Thin cakes	plates most flexible	very light	polished	PALE YELLOW	unctuous	Coromandel	as glass.
4. PERSIAN ISINGLASS.							Vitrum Persicum. H.
Round lumps	plates elastic	quivering	shivery	PALE RED	smooth	Island of Ormus, in red earth	covering miniatures.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. FRENCH ISINGLASS.							Vitrum Gallicum. H.
Broad cakes	plates ſcarce elaſtic	heavy	undulated	BROWN	fatty	Champaign, in rocks, by rivers	as glaſs, but poorly.
6. ICELAND ISINGLASS.							Vitrum Iſlandicum. N.
Broad maſſes	plates brittle	light	ſhivery	WHITE	harſh	Mount Hecla	
7. HUNGARIAN ISINGLASS.							Mica Hungarica. L.
Irregular lumps	plates brittle	heavy	ſcaly	YELLOW	unctuous	Cremnitz, in mines	
8. ORPIMENT ISINGLASS. ORPIMENT.							Vitrum Auripigmentum. H.
Uneven maſſes	plates brittle	heavy	undulated	GREENISH YELLOW	fatty, ſulphureous	Saxony, in mines	a yellow paint

T A L C.

G E N U S II.

G L I M M E R.

M I C A.

Compoſed of ſmall, looſe, irregular, ſhining Scales.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. GOLD GLIMMER.							Mica Aurea. W.
In ſmall rough maſſes	rigid	heavy	ſcaly	YELLOW	dry	Germany *	
2. SILVER GLIMMER.							Mica Argentea. W.
Larger uneven lumps	flexible	light	wavy	WHITE	fatty	Germany	
3. GREEN GLIMMER.							Mica Viridis. W.
Small rough lumps	hard	heavy	ſcaly	BRIGHT GREEN	harſh	Germany, in mines	
4. BLACK GLIMMER.							Mica Decuſſata. L.
Great rugged lumps	very hard	heavy	oblong and ſtreaky	BLACK	harſh	Denmark, in mines	
5. RED GLIMMER.							Mica Rubra. W.
In ſmall rude lumps	tender	heavy	rugged	RUDDY	fattiſh	Saxony, in mines	

6. VENETIAN GLIMMER. VENICE TALC.								Mica Talcosa. L.
In uneven masses	soft	heavy	undulated	GREENISH WHITE	most fatty	Norberg, in rocks	a cosmetic.	
7. CONVEX GLIMMER.								Mica Hæmisphærica. W.
In small half-round lumps	tender	light	coated	SILVERY	smooth	Finland, in clay		
8. UPRIGHT GLIMMER.								Mica Crystallina. L.
Large and uneven	stony	heavy	rais'd, three-corner'd, split	WHITISH	harsh	Sweden, in mines		
9. TWISTED GLIMMER.								Mica Undulata. W.
Rude masses	soft	heavy	wavy	YELLOW	fatty	Hartz forest, in mines		
10. STREAKY GLIMMER.								Mica Radians. W.
Flat pieces	brittle	heavy	thready	GREY	dry	Saxony, in rocks		

* Perhaps this is the Mica Nigra, calcined by subterranean Fires; for that becomes yellow, when burnt.

T A L C.

G E N U S III.

B L A C K L E A D.

M O L Y B D Æ N U M.

Compoſed of minute, fatty, irregular, and cloſe-connected Scales, ſtaining the hands.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. PURE BLACK LEAD.							
Compact	tender	light	smooth	GLOSSY BLACK	fatty	England and Germany, in hills	Molybdænum Impalpabile. L. lead pencils.
2. SCALY BLACK LEAD.							
Brittle	soft	heavy	tily	DEAD BLACK	smooth	Sweden, in mountains	Molybdænum Subsquammosum. L. pencils.
3. PLATED BLACK LEAD.							
Shattery	brittle	light	uneven	GREY BLACK	soft	Germany, in mines	Molybdænum Sabularelosum. L. pencils.
4. DUSTY BLACK LEAD.							
Scoty	firm	heavy	rough	BLACK	dry	Gosselaer, in mines	Molybdænum Compactum. L. a black paint.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. PERPLEX'D BLACK LEAD.							Molybdænum Intricatum. L.
Streaky	hard	heavy	thready	BLACK	rough	France, in rocks	a blacking
6. RADIATED BLACK LEAD.							Molybdænum Radiatum. L.
Streaked	hard	heavy	raiſed in ridges	GREYISH BLACK	dry	Sweden, in mines	for colouring earthen ware
7. KIDNEY BLACK LEAD.							Molybdænum Reniforme. L.
Chaffy	ſoft	light	duſty	DEAD BLACK	dry	Germany	for crucibles

8. SANDY BLACK LEAD.								Molybdæna Impura. W.
Rugged	crumbly	heavy	uneven	BROWN BLACK	harſh	Banks of the Rhine	a coarſe colour.	
9. WOLF BLACK LEAD.								Molybdænum Sperma Lupi. L.
Uneven	ſoft	very heavy	wavy	REDDISH BLACK	very unctuous	Weſtmoreland, in the hills	a good ordinary colour.	
10. DINOY BLACK LEAD.								Molybdæna Teſſularis. W.
Gritty	very hard	heavy	confuſed	GREYISH BLACK	unctuous	Upland		
11. BRIGHT BLACK LEAD.								Talcum Cubicum. B.
Flaky	hard	heavy	raiſed in dice	YELLOWISH BLACK	fatty	Bohemia		

THE Structure of these, and the Bodies of the three following Genera, are best seen in the sides of rough masses; rude as they are taken from the earth: where these are wanting, it is best seen in a piece newly broken, viewed crosswise.

In general, where the eye is not able to see it plainly, a reading-glass is to be used; and for the most confused kinds, a glass of more power.

T A L C.

G E N U S IV.

S O A P R O C K.

S M E C T I S.

Compoſed of ſmall, regular, fatty, tender, and cloſe-connected Flakes; formed into a compact ſmooth maſs.

WE ſhall begin to ſee, in this Genus, and from thence be led perfectly, in the three ſucceeding ones, to diſtinguiſh the way by which Nature gradually deſcends, from the purity and perfection of the finer Bodies in each Claſs; to thoſe ſo foul, and imperfect, that we at laſt loſe ſight of what they are.

The opake black Touchſtone differs as much from the bright Ruſſian Iſinglaſs, as one thing well can differ in its aſpect from another: yet, when all are thus traced through their gradations, we cannot doubt but it is the laſt of Talcs.

The Characters of theſe Foſſils are plaineſt in the pureſt; the Iſinglaſs: but even there, the Hecla kind loſes its tranſparence. They begin to degenerate in the Glimmers; they are yet leſs diſtinct in the Black Leads; and in theſe Soaprocks, and the ſucceeding Genera, the eye ſcarce perceives the plated ſtructure: but ſtill they are, in all, the ſame. Unformed Talc, or the ſubſtance of the Talcs, not formed into plates, often mixes with their flakes; and confuſes them: but having ſeen theſe flakes in the pureſt Iſinglaſs, they will be traced by the eye a great way thro' the Glimmers: a little aſſiſtance will ſhew them in Black Lead, and even in all theſe: and all the while, their ſmoothneſs to the touch, and fatty quality, deduced only from their broken plates, declare them every where.

The more opake of theſe Bodies will be repeated under the head of hardened earths, &c. with references to their juſt place here: and this ſeems as much as Nature allows to the methodical arrangement of Foſſils; which have not been formed with thoſe abſolute and diſtinctive characters we trace in the two higher orders of created Bodies.

SOAPROCK.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CORNSIH SOAPROCK.							Talcum Smectis Opacum. L.
In rude lumps	tender	heavy	marbled	RED AND WHITE	very fatty	Cornwall	for porcelain.
2. CHINA SOAPROCK.							Talcum Smectis Steatites. L.
In great maſſes	hard	heavy	rugged	GREYISH WHITE	fatty	China	in the fine porcelain.
3. SWEDISH SOAPROCK.							Talcum Smectis Lanelloſum. L.
Flat cakes	ſoft	light	poliſhed	RUDDY	very fatty	Sweden	cleaning woollen cloths.
4. GERMAN SOAPROCK.							Talcum Smectis Subdiaphanum. L.
In ſmall lumps	tender	light	rugged	WHITE SPOTTED WITH RED	ſoft	Hartz foreſt	cleaning woollen cloths.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. GREY PLATED SOAPROCK.							
Flat cakes	brittle	heavy	ſmooth	GREYISH	fatty	Sweden	Talcum Lamellare. L. for marking.
6. BLACK PLATED SOAPROCK.							
In thick cakes	very hard	very heavy	ſmooth and poliſhed	BLACK	oily	Germany	Talcum Corneum. L. for marking.
7. LEATHER SOAPROCK.							
In thin cakes	ſoft	light	uneven	PALE BROWN	fatty	Sweden	Talcum Coriaceum. L.
8. ROSE SOAPROCK.							
Rude lumps	tender	heavy	raiſed in convex flakes	ROSE-COLOUR	very ſoft	Sweden	Talcum Carneum. L. cleaning wool.

9. GREEN SOAPROCK.								Talcum Viridans. L.
Uneven lumps	ſoft	very heavy	dusty	DEEP GREEN	dry	Germany		
10. RED SOAPROCK.								Talcum Rubrica. L.
Vaſt maſſes	ſoft	heavy	uneven	DULL RED	fatty	England	for marking.	
11. WHITE SOAPROCK.								Talcum Lithomarga. L.
Flat maſſes	ſoft	light	dusty	WHITISH	fatty	Swiſſerland		
12. FRENCH SOAPROCK. FRENCH CHALK.								Le Talc Verd de Briancon. B.
In great flatted lumps	hard	heavy	ſmooth	GREENISH WHITE	very fatty	France	for marking.	
13. SPOTTED SOAPROCK.								Le Talc Verd Marbré. B.
Small flatted lumps	ſoft	light	uneven	GREY AND GREEN	fatty	France	for cleaning cloaths.	

T A L C.

G E N U S V.

P O T S T O N E.

O L L A R I S.

Compoſed of broad, narrow, and uneven Flakes, mixed irregularly together.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. SOAPY POTSTONE.							Pierre Ollaire. W.
Great maſſes	hard	very heavy	uneven	MOTTLED GREY AND GREEN	fatty	Sweden	for veſſels to bear the fire: it hardens to a ſtone in burning.
2. TENDER POTSTONE.							Pierre de Côme. B.
Rude maſſes	ſoft	heavy	irregular	GREY AND RUDDY	very fatty	Swiſſerland	for pots to bear the fire.
3. COARSE POTSTONE.							Pierre Ollaire à gros graines. B.
Large maſſes	hard	heavy	ſcaly	GREY AND BLACK	dry and harſh	Germany	for furnaces.

T A L C.

G E N U S VI.

C O L U B R I N E.

C O L U B R I N U S.

Compoſed of ſmall, flat, thick, even, and cloſe-connected Flakes.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. SOFT COLUBRINE.							La Colubrine tendre. B.
In flat maſſes	ſoft	light	uneven	OLIVE-COLOURED	very fatty	Salberg	for ornaments.
2. HARD COLUBRINE.							La Colubrine dure. B.
Rude maſſes	very hard	heavy	rugged	IRON-GREY	fatty	Germany	for furnaces.
3. LOOSE COLUBRINE.							Lapis Colubrinus Lamelloſus. B.
Flat maſſes	hard	heavy	flaky	GREENISH	fatty	Salberg	for furnaces.

ALL the Colubrines cut eaſily, but will take no poliſh.

If it were not for the laſt Species, it would have been hard to know the Colubrines were Talcs: but here we evidently ſee the plates; though they will not ſeparate.

In this, and in the Soaprocks, and the Potſtones, all is Talc, though mixed and cruſhed together. Theſe afford inſtances of Talc fouled with Earth; but ſtill 'tis talcy Earth; and perhaps unformed Talc: and in the Ollaris, in particular, we ſee it in the moſt mixed ſtate of all; with unformed earthy Talc, and talcy Fibres.

T A L C.

GENUS VII.

SERPENTINE.

SERPENTINUS.

Compoſed of Plates connected in ſmall lumps, and mixed with unformed Talc.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. DARK SERPENTINE.							Talcum Serpentinus. L.
In great lumps	very hard	very heavy	rugged	MARBLED OF GREEN AND BLACK	dry	Finland	for marble mortars.
2. BRIGHT SERPENTINE.							La Serpentine demi transparent. B.
In vast masses	hard	heavy	half-polished	MARBLED OF DARK GREEN AND WHITE	fatty	Germany	for ornaments.
3. THREADY SERPENTINE. NEPHRITIC STONE.							Talcum Nephriticus. L.
In large lumps	hard	very heavy	bright	LIGHT GREEN	fatty	America	in medicine, for the gravel.
4. BLACK SERPENTINE. TOUCHSTONE.							Lapis Metallorum. W.
In vast rude masses	hard	heavy	smooth	BLACK	fatty	Silesia	for trying metals.

NATIVE FOSSILS.

CLASS II.

SELENITE.

SELENITES.

Composed of flexible, but not elastic Plates.

SELENITE is softer than Spar; less weighty, and somewhat less transparent.

Its Plates break into Rhombs; and when it crystalizes free and pure, this is its natural and original form.

We find it transparent, of various Figures; but composed all of united Rhombs: and when its concretion has been interrupted, we see it in the forms of granulated, fibrous, or scaly masses, and call them *Gypsa*, or *Plaister Stones*.

The substance is the same in all; for Selenite, like Spar, is but one thing, one substance; and whether we find it pure in beds of clay, or coating walls, or hanging in Icicles from the roofs of caverns; whether compact as marble, or loose as powder, still the substance is one: it proves the same on the severest trials; and when carefully disunited, and

 viewed

viewed before the microſcope, its particles are all plated, watery, and rhombic.

Selenite therefore is one thing; one ſubſtance, in all its variety of forms: and 'tis but idle to divide its different appearances under the affected double terms of Species and Varieties. The laws of Botany cannot be juſtly extended to Foſſils; becauſe they are not organized bodies, or raiſed from ſeeds: in all its forms this is one thing; and the whole purpoſe here is to lay down its different appearances, for their diſpoſition in a cabinet.

This Treatiſe is written for the arrangement of one great Collection; if it ſerves others, ſo much the better; but that is all its purpoſe.

We find even Arſenic in Selenites; nor did I ever ſee one without iron; and this, as more or leſs, cauſes a variety of forms: but ſtill 'tis the one ſubſtance Selenite thus alter'd; and thrown, by means we know, into theſe appearances; and the term Species belongs to none of them: we uſe it for convenience of diſtinction; but muſt not diſpute about its propriety.

ORIGIN of SELENITE.

SELENITE is compoſed of an Alkaline Earth, ſaturated with the Acid of Vitriol.

We know this: for we can make ſomething very like it by art this way: 'tis pity we cannot do this exactly. We have its nature in theſe artificial bodies, but not its form. We can produce a Salt with all the properties of Selenite; and this, among the reſt, that when well made, we can't again diſſolve it: but I have never ſucceeded ſo far as to get this Salt in its Rhombic form: we have it in ſtriated maſſes, and in cluſtered flakes; and in the ſame forms we have alſo natural Selenite. Art imitates the more imperfect and diſturbed cryſtalizations of nature in this ſubſtance; and 'tis as much as we can expect from it; we cannot give the pure and perfect forms of nature.

Selenite will not ſtrike fire with ſteel; for 'tis ſo ſoft, we cruſh it between the fingers: it will not ferment with acids, for 'tis a neutral Body in its nature; an earth capable of fermenting with them, but already ſaturated. Some kinds effervesce ſlightly, but 'tis from a mixture of Spar; for nature makes her ſaturations accurately. Cronſtedt moſt juſtly talks of iron in ſome kinds; I find it, as already ſaid, in all; nor is there any end of the variety of other mixtures.

Selenite falls into powder by a very ſlight heat: and, as 'tis ſaid, may be diſſolved and recryſtalized. I hope it is ſo; but have not found the way to perfect it in my own trials. This powder hardens with water; but without heat, or what we call, ſlaking.

'Tis ſtrange Wallerius ſhould ſuppoſe the Selenite Bodies not to break into Rhombs: 'tis conſtant, and 'tis of their character; they differ in this from Talcs, whoſe flakes will never break into any form, tho' they will ſplit for ever. They are ſimple; and are the very idea of mathematical extenſion, breadth without thickneſs.

SELENITES.

ORDER I.

SELENITE.

SELENITES RHOMBICUS.

In form of ſimple or united Rhombs, variouſly connected.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLEAR SELENITE.							
Perfect clean Rhomb of ten ſides	tender	light	poliſh'd	PELLUCID	clean edged	Oxfordſhire, in clay	Natrum Selenites. L. for grottos.
2. WHITE SELENITE.							
Thick, rude Rhomb of ten ſides.	hard	light	rugged	MILKY	ſcaly edged	Northamptonſhire, in clay pits	Selenites Albus. W. a medicine for fluxes.
3. YELLOW SELENITE.							
A clean thin Rhomb of ten ſides	very ſoft	heavy	poliſh'd	PALE YELLOW	ſhattery	Leiceſterſhire	Selenites Flavus. W. for grottos.
4. MANY COLOUR'D SELENITE.							
A priſm of fourteen ſides	hard	heavy	rugged	WHITISH BROWN, WITH BLUE AND RUDDY VEINS	crackly, feather'd in the centre	Northamptonſhire, in clay	Natrum Flexile. L. curioſity.

5. BASALTINE SELENITE.								Natrum Basaltinum. P.
A prism of six sides, with two pyramids	soft and tender	heavy	polished	DUSKY BROWN	full of cracks	Norway	curiosity.	Selenite Cuneiforme de Rome de Lisle.
6. WEDGE SELENITE.								
An arrow head, form'd of two wedges	hard	light	glossy	WHITISH	sharp edged	France	for scagliola.	Selenites Compositus.
7. COMPLEX SELENITE.								
A flat plate of Rhombs and Wedges	tender	heavy	polished	COLOUR-LESS	variously cracked	Greenwich	for grottos.	Drusa Gypsea Flava.
8. GOLDEN SELENITE.								
A cluster of Wedges	soft	heavy	glossy	PALE YELLOW	shattery	France	for scagliola.	

SELENITES.

ORDER II.

PLAISTER SELENITE.

GYPSUM.

Compoſed of numerous ſmall Scales, irregularly laid together.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE PLAISTER STONE.							Gypſum Micaceum Cronſtedt.
A maſs of thick ſcales	crumbly	very heavy	rough and coarſe	DULL WHITE	hard particles	Germany	ſtucco work.
2. GREY PLAISTER STONE.							Gypſum Micaceum Griſeum Cronſtedt.
Maſſes of ſmall ſcales	compact	heavy	rugged	SILVERY GREY	tender particles	Norway	ſtucco work.
3. YELLOW PLAISTER STONE.							Gypſum Micaceum Flavum Cronſtedt.
Maſſes of thick ſcales	tender	heavy	uneven	YELLOWISH	ſmall, ſoft particles	France	ſtucco work.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
4. RUDDY PLAISTER STONE.							Gypſum Rubrum.
Vaſt maſſes of ſmall ſcales	ſoft	very heavy	rugged	PALE RED	friable	Yorkſhire	ſtucco work.
5. GLOSSY PLAISTER STONE.							Gypſum Pellucidum. W.
Bright maſſes of wav'd ſcales	friable	heavy	uneven	CLEAR	ſplitting	Germany	ſtucco work.
6. POWDER PLAISTER STONE.							Terra Gypſea Cronſtedt. W.
White duſt	ſoft	light	granulate	WHITE	dry	Saxony	ſtucco work.

SELENITES.

ORDER III.

THREADY SELENITE.

GYPSUM STRIATUM.

Compofed of long threads, laid one by another.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. WHITE THREADY SELENITE. ENGLISH TALC.								
Broad, fibrous masses	compact	very heavy	even	BRIGHT, BUT WHITISH	splits perpendicularly	Yorkshire	for cleaning lace and plate.	Gypsum Sirictum. W.
2. CLEAR THREADY SELENITE.								
In small masses	tender	heavy	polished	COLOUR-LESS	wavy	Sweden		Gypsum Fibrosum Cronstedt.
3. GREENISH THREADY SELENITE.								
Oblong masses	brittle	very heavy	rugged	PALE GREENISH WHITE	flaky	Germany		Le Gypse Scissile. W.
4. POLISHED THREADY SELENITE.								
Short, small masses	tough	heavy	smooth	PALE OLIVE-COLOUR'D	compact	Norway		Le Gypse Amianthe. W.
5. YELLOW THREADY SELENITE.								
Small clusters	tender	light	bright	PALE YELLOW	fissile easily	Sweden		Gypsum Capillare Cronstedt.

SELENITES.

ORDER IV.

RADIATED SELENITES.

GYPSUM RADIATUM.

Formed into Rays, or Crests, or Ridges.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. STARRY SELENITE. CHEKAO.							Gypſum Stellatum.
Regular ſtars	very hard	very heavy	poliſh'd	PALE BROWN	lucid in the dark after in-ſolation	In China, and Iſland of Shepey, on the waxen vein	* for china ware.
2. WHITE COCKSCOMB SELENITE. PETUNSE.							Gypſum Criſtatum Cronſtedt.
Cruſts on balls of Spar.	very hard	heavy	coarſe	WHITE	irregular	Germany	* for china ware.
3. RUDDY COCKSCOMB SELENITE.							Gypſum Criſtatum Rubrum Cronſtedt.
Rude lumps	hard	very heavy	ſmooth	REDDISH	jagged	Sweden	

4. BONONIAN SELENITE.							Phosphorus Bononiensis. W.
Roundish lumps	hard	very heavy	glossy	PALE BROWN	lucid after calcination	Italy	
5. LIVER SELENITE.							Lapis Hepaticus Cronstedt.
Coarse, scaly lumps	very hard	heavy	ridg'd, and uneven	BROWNISH YELLOW	sulphureous smell when struck	Sweden	
6. BLACK SELENITE.							Hepaticus Niger Cronstedt.
Small plated masses	hard	heavy	granulated	BLACK	very sulphureous	Sweden	

* These, and the Soap Rock, seem the great ingredients of the China Porcelane: and we have them all.

SELENITES.

ORDER V.

CURTAIN'D SELENITE.

SELENITES STIRIATA.

Coating the cracks of plaiſter pits, in form of folded curtains.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. WHITE CURTAIN'D SELENITE.							Stalactites Gipſeus Albus Cronſtedt.
Vaſt ſheets	hard	heavy	wav'd, and gloſſy	PURE WHITE	ſhattery	Italy	as alabaſter.
2. YELLOW CURTAIN'D SELENITE.							Stalactites Gypſeus Flavus Cronſtedt.
Great ſheets	hard	heavy	poliſh'd	BROWNISH YELLOW	ſhattery	France	as alabaſter.

SELENITES.

ORDER VI.

STALACTICAL SELENITE.

SELENITES STALACTITIUS.

Hanging like Icicles from roofs of hollows.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. CLEAR STALACTICAL SELENITE.							
Short cones	tender	heavy	rumpled, but gloſſy	COLOUR-LESS	brittle	Italy	Gypſum Spatoſum Stalactium Cronſtedt.
2. YELLOW STALACTICAL SELENITE.							
Long cones	hard	heavy	circled	YELLOWISH	very brittle	Sicily	Gypſum Spatoſum Stalactium Flavum Cronſtedt

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. WHITE STALACTICAL SELENITE.							Gypsum Spatosum Stalactium Album Cronstedt.
Rude lumps and risings	tender	heavy	botryoide	WHITE	brittle	Sweden	

SELENITES.

ORDER VII.

STONY SELENITES.

SELENITES LAPIDEÆ.

In hard, solid, shapeless masses.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE STONY SELENITE. WHITE ALABASTER.							Gypsum Solidum. W.
Thick masses	tender	heavy	uneven	PURE WHITE	uniform in texture	Ægypt	for ornaments.
2. BROWN STONY SELENITE.							Alabastrum Opacum Cronstedt.
Rude lumps	hard	heavy	scaly	PALE BROWN	shattery	Sicily	for ornaments.
3. YELLOW STONY SELENITE.							Alabastrum Flavum Cronstedt.
Flat cakes	hard	very heavy	even	DULL YELLOW	shattery	Greece	for ornaments.
4. AMBER STONY SELENITE.							Alabastrum Flavum Diaphanum Cronstedt.
Great masses	hard	heavy	wav'd	AMBER-COLOUR'D	compact	Ægypt and Persia	for ornaments.
5. GREEN STONY SELENITE. NEPHRITIC STONE.							Pierre Nephritique. W.
Great masses	hard	heavy	uneven	PALE GREEN, CLOUDED	greasy	America	a supposed medicine for the gravel.

FROM Selenite we naturally advance to Spar and enter upon one of the moſt intricate, an varied claſſes of the mineral kingdom.

Some general reflection ought to introduce a ſubje ſo important: and under an inſtance ſo commanding, an ſo explanatory of the reſt, it may be proper to caſt an ey upon the general courſe of nature, in the Foſſil world.

When we have found the real origin of thi pure Stone, we ſhall be led to that of half the con cretes that we are about to examine: and when w have ſeen how this one ſubſtance aſſumes its variou forms and colours, we ſhall judge eaſily of the reſt 'Tis not impoſſible to trace this accurately; nor is an thing required to the undertaking but attention to th neighbouring Foſſils where it is found; and to th beds thro' which the level of the country, and con- ſtruction of its ſtrata will ſhew it muſt have run befor concretion. This obſervation, carefully made, wil give the Philoſophic Hiſtory of its varied appearances and lay them regularly down in a true natural method but firſt we are to underſtand its origin; and its place i the great chain of beings.

OF THE

ORIGIN * of SPAR.

THE Series of Foſſils make one great circle; for ever returning into itſelf.

There are a few primitive bodies; Chalk, Clay, Bitumen, Talc, and the Mineral Acid.

Theſe, variouſly mixed, form many different compound Foſſils: which mingling, in ſome places, farther with one another, give decompounds.

Theſe (in other places) give up their ſeveral primitives again to water: which delivers them pure in ſome other parts; ready to form mixt and compound bodies again.

To trace them thro' theſe combinations, and to their natural analyſis again, is the whole buſineſs of the Student in this ſcience: for here is no diſtinction but by mixture: no origin from egg, or ſeed.

A great deal of pure Clay mixed with a little quantity of various Stones, forms the different Clays.

And a great deal of Stone with a little of the Clays, forms the various ſpecies of Stones.

* Publiſhed ſeparately, July 1772, as a Specimen of a method of Foſſils.

An inſtance of this courſe of nature appears in the philoſophic Hiſtory of Spar.

1. The primitives, as we have ſeen, are,

Water, *Bitumen*, *Chalk*, *Clay*, *Talc*, and *Mineral Acid*:

To theſe, the operations of the air, and fire give great powers of acting. We thus find

2. *Heavy Vapours*, form'd of air, and much water. Theſe, pervading all things,

3. Meet the Mineral Acid [1], and uniting with it; if they run clear to the ſurface, afford Medicinal ſprings; but

4. Thus united, they may fall upon Bitumen: this is no-where more frequent than in Limeſtone Rocks; and often ſtands in puddles, in their natural hollows [2].

5. By this mixture, uniting in its courſe, is form'd a real, tho' a fluid Sulphur: for Sulphur is nothing elſe; nor can be form'd by any other means [3].

6. This Sulphur, not yet concreted, paſſes in its

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[1] The Electric Æther of the under world; preſent every where, but only ſeen concentrated, or in its mixtures. It affects ſome things, Bitumen moſt: and avoids others.

[2] At Naples; in the Venetian Territories; and in Perſia, this is very common.

[3] Abſolute Sulphur may be made by art with eaſe and certainty this way. The Acid of Vitriol, with any thing inflammable, affords it.

liquid,

liquid form, thro' the pores of the Limeſtone; diſſolving part of its purer Chalk as it goes [4].

7. Water thus ſaturated with the principles of Sulphur, and with Chalk, keeps on its gradual courſe horizontally thro' the ſame Lime Rock, till it meets a fiſſure; a perpendicular crack, or opening; dividing one part of the rock from another. Here it ouzes forth: and meeting with a lighter air, hangs; and evaporates ſlowly.

8. Slow evaporation, and perfect reſt, are the requiſites of cryſtalization. The Sulphur and pure Chalk thus united, form one ſolid body; which cryſtalizing gradually, appears in regular rhomboidal particles: and is the ſubſtance we call Spar [5].

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4 Limeſtone is only coloured, hardened Chalk; and Marble is the ſame. Marble is a purer Limeſtone, and Limeſtone a coarſer Marble.

5 Spar ſuppoſed to be one thing, is therefore a mix'd body, and ſo are the pureſt Salts. We can make a ſubſtance of the nature of Spar, by cryſtalizing the lixivium of Lime and Sulphur.

NATIVE FOSSILS.

CLASS III.

SPAR.

SPATUM.

A pure Foſſil; compoſed of Brittle Rhombs.

SPAR is known from Talc by its want of elaſticity;
—from Selenite by its want of flexibility;
—from Cryſtal by its dullneſs, and by fermenting with Acids.

It is heavier than any of the three other pellucid Foſſils; and is known from all bodies in the world (when pure enough to be ſeen through) by its doubling lines laid under; and view'd through it.

This laſt property has been ſuppoſed peculiar to that ſpecies of Spar call'd Iſland Cryſtal: and the greateſt writers, Linnæus, Wallerius, Cronſtedt, and the long *et cætera*, have ſeparated that body from the pure Rhombic Spar; which they ſuppoſed not to have the double refraction. But this power reſides in all Spar I have examined: and is of its nature: as it ariſes from the internal conſtruction of the body, which is made up of ſmaller Rhombs, apply'd one to another.

The

The very atoms of Spar are Rhombic; and thoſe ſmalleſt pieces into which it may be ſeparated by gentle Acids, without ſolution, apply'd to the microſcope over a line proportionably fine, have the ſame power.

No body has this conſtruction except Spar; therefore no other natural or artificial ſubſtance has this power of double refraction. Even Sir Iſaac Newton has ſaid, Cryſtal has ſomething of this power; in vain: for no authority can ſtand againſt the teſtimony of the ſenſes. All different mediums vary in refraction; but this peculiar power reſides only in a pellucid body formed of connected Rhombs.

The ſtate of refraction in the pellucid natural bodies is this,

1. Talc in thick maſſes elevates the line.
2. Selenite waves it.
3. Cryſtal diſtorts it.
4. Spar gives it double.

All Spar does this, even that which takes the form of Cryſtal, in Pyramids, and Columns: therefore even the variouſly angulated forms of Spar are compoſed of Rhombs; and the conſtruction of Spar, and of Cryſtal, are perfectly different, even while their forms are the ſame.

Spar is ſeldom found original, and free: a few pure Rhombs;

Rhombs; and two Columns, double pointed, whicl were dug in the Hartz Foreſt; are all I have of it.

Nature has mixed its particles among the matter o the Marbles and Limeſtones; from whence it is wathe forth by the pervading water, and left ſlowly by it, i their cracks and fiſſures; where it aſſumes theſe va rious forms:

1. Pure Rhombs of a larger ſize.
2. Rude maſſes, form'd of coarſe connecte Rhombs.
3. Plates compoſed of connected Rhombs.
4. Columnar, Pyramidal, and Cubic Figures fix'd upon the ſurface of theſe rude maſſes

In this latter caſe the rude maſs continues uncolour'd and is the Root; and the Columnar or Pyramidal Figures riſe from it frequently yellow, often of othe colours: theſe cut into a kind of Gems, but ſtil have the double refraction equally with that part w call the Root.

5. Icicles and Dropſtones.

That the Spar form'd in fiſſures of rocks, is thu waſh'd out of the Limeſtone itſelf is certain:

Becauſe none but Limeſtone Rocks have Spar i their fiſſures; Rocks of a cryſtaline matter, or form' of vitrifiable Stone, have Cryſtal; never Spar in thei cracks.

Linnæu

Linnæus wonders at the nature of that force which ſplit the Rocks into theſe cracks: but probably the cauſe is very familiar; they were formed moiſt, and crack'd in drying.

Spar grows continually; for wherefoever there is a crack in a Limeſtone Rock, new, or old; Spar always fills it; and over-runs the ſurface.

Letters cut hollow in a living Rock of Limeſtone, fill up, in a courſe of years, with Spar; and what were made in Creux are found in Relief. This has been ſeen in Gothland by the eminent Swede; and in the grotto of Antiparos by Tournefort. The very time may be determined by the dates, which are often a part of the inſcription; but it is always long. The Spar ſtands higher as the time is more diſtant: and has been ſeen in ſome places a quarter of an inch above the level of the ſurface.

If there could want a proof of the continual growth of Spar, the Stalactites would ſhew it; and the incruſtations, in what are called our petrifying ſprings; but that is a fouler ſort: there is in Norway a pyramid of Spar two inches long, which was once mine; in which two branches of the ſolid Heath moſs, or Lichen, are perfectly embodied.

It has been thought the Spar in cracks of Rocks was brought from elſewhere by water; or was and is originally in all water: the latter is the opinion of Linnæus;

Linnæus; Henkell maintains the former. But if either were the caſe, Spar would be ſometimes found in Vitreſcent Rocks, and Cryſtal in thoſe of Limeſtone; which obſervation denies.

Spar they ſay will be formed where water can be retain'd; but indeed alſo where it cannot; 'tis enough that it ouzes ſlowly: nay, not water alone diſſolves Spar; but it can be retain'd in vapour. I have from Cornwall incruſtations of true Stalactite, form'd in the pipes of fire engines in the mines, at heighths to which the water never aſcends, by many feet; but only vapour.

Mundick is alſo thus a creature of the air, in many places. I have trigonal pyramids of Spar, which hung from the top of the Bauman's Cave, in the Hartz, covered with Cubic Mundick; there is none in the Spar itſelf; and from the particular circumſtances of the ſpecimen, water could not have lodg'd upon it only vapour.

Spar is one thing, of one weight, one hardneſs, and when pure can never be miſtaken for any other Foſſil. It is liable to have other bodies mixt with it; and to be altered in its condition by that mixture: but 'tis itſelf the ſame. Wallerius diſtinguiſhes three degrees of hardneſs in this Foſſil; but they are owing to thoſe mixtures; the leaſt hard is the true condition of Spar; the other degrees ariſe from iron, or other additions.

It is the opinion of Linnæus, that Spar owes its angulated form to Sea Salt; and the Cryſtals to other Salts: but there is no warrant in nature for this judgement. Salts are acrid, and diſſolve in water. Theſe Foſſils have neither of thoſe qualities: and who ſhall tell us that the property of forming itſelf into regularly angulated Figures is peculiar to Salts? We have no authority to believe it is wanting in Cryſtal, and Spar; and we have the evidence of our ſenſes that they have it.

The ingenious and ingenuous Crouſtedt well obſerves, theſe Figures ought not to be aſcribed to Salts, till the preſence of ſuch Salts can be prov'd in them.

The calcarious nature of Spar is of its eſſence; and no form, nor all the other characters in the world, could conſtitute a thing a Spar, that wanted this. They all ferment with Acids, and they burn to Lime: nor is this latter quality equivocal, as ſome would think, becauſe by the fire of a great burning glaſs, Spar vitrifies. This is not the fire, when we ſpeak of Lime; and it can be a teſt of nothing; becauſe all things vitrify before it: that is the extream force of fire: and the ultimate effect of fire on all bodies is vitrification.

Linnæus ſays, the Spar he calls Natro-ſpatoſum, ſcarce does effervesce with Acids: and it may be added, that the particles of that Spar are ſcarcely at all Rhombic: Spar and Cryſtal are mixt in thoſe bodies;

 and

and they have mixt qualities; but ſtill as there is ſome Spar, there is ſome Effervescence.

'Tis vain to give the forms of Spar to Natrum; for we not only find no Natrum there, but different Spars have forms of different Salts; and the great patron of the Salt Syſtem allows, that ſome of them affect the various angulated Figures of Alum, Sea Salt, Vitriol, and the reſt. 'Tis true, they reſemble thoſe forms; but they have not thoſe forms exactly: nor is either of theſe, or any other Salt whatever, to be found exiſting in any of them.

But whither will not the wind of Theory blow even the ſteadieſt judgements: the foremoſt of the writers, who favour this Syſtem, becauſe there are in Spars certain forms that do not agree with thoſe of any known Salt, fancies for the formation of theſe that there exiſt Salts, not otherwiſe known to us, but by this operation. When Theory can reach this heighth, it may do what it pleaſes: to create Cauſes, becauſe we ſee Effects that ſeem to us to require them, is to make all things eaſy; and at the cheapeſt rate.

If we can ever bring Spar, after ſolution, to recryſtalize, as Salt; we ſhall ſee all things explained in this particular. 'Tis what I have try'd four years, with poor ſucceſs; and I have now requeſted the ableſt chymiſt that we have, to join with me in the attempt. What may ariſe under his experienced hand, I know not: all I have found is, that the ſwifter the fluid is evaporated,

porated, the coarſer is the matter left behind; and the more length of time is given, the nearer it approaches to a promiſe of Cryſtals.

I think when this ſhall be accompliſh'd, we ſhall find all Spar to be but one thing; differing only according to the other matters mixed with it. 'Tis ſaid, the Selenite powder'd and mixt in water, affords Cryſtals; and Kahler gives the authority of an eminent metallurgiſt for it: with me neither has this ſucceeded yet: but I have no deſpair; and tho' it never ſhould ſucceed with me, it may with others: when that is ſeen, the other, more important as it is, need not be ſuppoſed impoſſible.

Nothing is more familiar than the production of what it is the cuſtom to call, Selenitical Salts; Urine affords them; and ſome preparations of Sulphur; but to recryſtalize Selenite is, to produce, from a clear fluid, pellucid dodecahacedral Rhombs, flexile, not elaſtic, and not ſoluble again in water: and he who ſhall effect this, need not deſpair of recryſtalizing alſo Spar.

The Salts in Urine that has ſtood long come nearer the nature of Foſſils than any thing we know; and Tartar, form'd from Wine, is very difficult of ſolution: yet both theſe may be melted in pure water. The Salt produced by ſlow cryſtalization from a Lixivium of Lime and Sulphur, comes neareſt of all to Spar; but ſtill it is but an approach; and not a ſame-

neſs: as he who is well acquainted with all the qualities of the vitriolated Tartar will perceive; nor do I conceive Henkel's receipt, form'd on the ſame foundation, would go any farther: but till men ſpeak plain, 'tis vain to war againſt their buried meaning.

In fine the formation of Spar is yet a ſubject of enquiry: its atoms are all Spar; each particle into which we can without violence divide it, is the ſame in all reſpects as the whole: and as the Foſſil world admits no generation, or birth, by egg, or ſeed, it ſeems moſt probable that all the variety of forms in which we ſee this Protean Mineral, are owing to no cauſe beſide the arrangement of Rhombs into as many forms as they are capable of producing. It fills the cracks of its own rocks: and of no other: for Cryſtal Columns riſe from cryſtaline Rocks; and from Metallic Maſſes, fractur'd, grow Pyritæ; each ſeparated from the great mixt body we ſee ſplit; and each form'd into Figures by its own laws, without the intervention of Salt, or other matter.

We find hollow Cryſtals, and we have hollow Pyramids of Spar; but 'tis a raſh thought, tho' of a great man, to imagine that a Cryſtal of Salt was firſt form'd in theſe caſes; and when the ſtony coat was finiſhed over, it melted away again: this is imagination: but there is not a hollow Stalactite that may not ſhew the ſenſes, and convince the reaſon, that this ſhell of Spar, or Cryſtal, may be form'd without a ſolid nucleus.

There

There are no entire Rocks of Spar; and they who thought they had ſeen ſuch of Cryſtal, perhaps miſtook pure Ice for them. Both Spar and Cryſtal riſe in general from foul Stones; and they who thought Ice grew to them in time, were ſcarce more pardonable than ſuch as took Ice for them. Scheukzer has ſeen the difficulty of accounting for their forms, and joined the lamentation of Philoſophers upon that ſubject; for the Salt Syſtem was not then in being: but the old Pliny has not only lamented this difficulty, but aſſigned its cauſe; and this a cauſe to overthrow that ſyſtem utterly: it is, that tho' the Figures be all regular, they are not all alike; or all reſolvable into the ſame laws.

'Tis an invidious office, and unpleaſing, to dwell upon the errors of thoſe who wrote before; but theſe are ſo receiv'd, and ſo eſtabliſh'd, that there is no other way to truth.

Wallerius ſays, that Spar is compoſed of Rhombic and Pyramidal particles: and therefore breaks into both theſe forms. It is unwillingly I diſſent in a few particulars, from an author with whom reaſon and obſervation command me to agree in a great many: but this is a doctrine which ſtrikes at the root of all accurate knowledge in reſpect of this body.

By this account Spar would be two things, not one: its atoms would have two Figures; and we ſhould loſe the great diſtinction by which it is kept

ſeparate

ſeparate from all other bodies. I have examined this point with all poſſible attention; and find the pyramidal Figures of Spar, whether in greater or ſmaller pieces, to be a ſecondary form; compoſed always of Rhombs: but the Rhombic Figure never to have any form in its conſtituent parts beſide its own. The Pyramids, great or ſmall, ſeparate into Rhombs; the Rhombs never into Pyramids. The true way of dividing Spar is, by an Acid, carefully manag'd; for the parts are always ſeparated, before they are diſſolved.

It is a ſingular and a juſt obſervation of the ſame author, that no pentagonal Spar has ever been found; tho' angles in moſt other numbers are frequent; but this is not to be attributed with him, to an imaginary Salt, Alcaline, and Muriatic; it reſts upon a much more ſolid baſe: which is, that the particular Figure of the Rhombs of Spar, admit the conſtructing any other angulated form, only not pentagonal.

It has been ſaid, that Iſland Cryſtal ſhines in the dark after it has been calcin'd in manner of the Bolonian Stone; but this is not particular to that Species: it is the quality of all Spar, as Spar; only there requires great nicety in the calcination: perhaps Selenite alſo has this power. Linnæus refers the Bolonian Stone to Spars: to me it has appear'd rather a Selenite; and of all bodies in nature, moſt of kin to that ſpecies of Selenite we call the Star, upon the waxen vein. I have therefore retain'd it in that place, till more of this ſcarce Foſſil comes in my way for trial: if

it

it prove Spar, 'tis easily removed into that Class; and thus, and only thus, we can arrive at truth; after a thousand errors.

That the Hog Spar affords Flowers on sublimation, has been urged as a great proof of its containing Salts of some kind or other; known or unknown: but surely this property is more naturally resolved into another source. All Bitumens yield flowers on sublimation; and we have the testimony of our senses to the presence of a Bitumen in the Lapis Suillus: it stinks of it. Nay more, there is a smell of Sulphur in all Spar, when calcined: Henkel and Wallerius, as well as I, have found it; and if we could give way to any thought of secondary forms, in a Fossil whose construction appears perfectly homogene, and simple, my sense of it would be, not to seek them in imaginary Salts, but real Sulphur.

We see the way art imitates it best, is by the Crystals of a liquor in which Lime and Sulphur have been boil'd. Sulphur is thus disclosed on the calcining of Spar; and for the other ingredient, Lime, we cannot be at a loss; since it has been observed, no Spar is ever produced in cracks of any rocks, except those of Limestone: nay, and what may strengthen this opinion, the Lime of Spar is weaker than that of Limestone, which, a little Sulphur may cause. All this, is but conjecture; and is delivered as such, and no other; but yet it rests on the testimonies of the senses; not on the flights of the imagination: and it is by conjecture,

ture, in theſe dark and difficult reſearches, we muſt arrive at truth.

I claim no better authority for many of the particular obſervations here, than for this general one; they are indeed all founded on examination, and experiments, now made on the occaſion; but they are examinations and experiments made only on the bodies in my own ſcanty ſtore: I invite, I ſolicit, and entreat with my beſt earneſtneſs, others to repeat them on their own. If they anſwer as in mine, the doctrines are eſtabliſh'd; if they differ, there is no one in the world to whom that truth will be more welcome than to myſelf. To equivocate about an error, is pitiful; to attempt to juſtify it, is diſingenuous: no man ſhould be aſhamed of ſetting right his own miſtakes (eſpecially in matters where miſtakes are unavoidable) whether by his own or others obſervation. With how many hundred errors did the Species Plantarum make its firſt appearance; how many of them have been rectify'd; and how many yet remain to be ſet right? Yet no one ever blamed Linnæus for his firſt conjectures; nor has the world ſeen any other book of Science of equal value.

Such errors are the children of imperfect information; and muſt be found in all who attempt to write for general utility.

Let others therefore freely repeat theſe my experiments, and add more of their own; and with

an

an honeſt freedom tell the reſult of all. My ſingle attention can only make a few experiments, where true knowledge demands a thouſand: but the reſult of different trials will bring forth truth.

It never was more needed in Philoſophy than in the part before us; for with all the plauſibility of ſyſtem, we cannot but perceive upon this free and fair enquiry, that the Student in Foſſils has yet to work upon a chaos: and that the paths into a better light, are ſtop'd and clos'd up utterly: not by ignorance; but what is much worſe, by authenticated error; authenticated even by greateſt names. We muſt unwind this Charm, if ever we hope to gain the right clue to lead us thro' the labyrinth of nature: we muſt break the fated Taliſman; and all the ſeemingly impregnable ſtructures will vaniſh: the ground will be clear before us; and if we loſe ourſelves in the open way, 'tis eaſy to be ſet right again.

SPAR form'd by nature, as above related, may either concrete in its pure ſtate as ſoon as made; or it may paſs while yet fluid, thro' various ſtrata of Earthy, Saline, Mineral, and other matter, and receive great changes both in form and colour from them: it may appear to us therefore, according to theſe circumſtances, either

in its own pure ſtate of a colourleſs Rhomb;
or foul'd by earths; or ting'd by metals;
or plated, by an admixture of Talc;
or render'd cubic by the natrane Marle; and thoſe cubes ſtain'd to a mimickry of Gems by metals;

or it may be ſhap'd into Polygons by an aluminous earth;

or thrown into Pyramids, with or without Columns, by the Salts of Mineral Waters:

Or from the mere nature of its concretion, it may appear as curtains ſpread upon a wall;

as Icicles hanging from a roof;

or Globules drop'd upon the floor;

or as a coat upon moſſes, or ſhells, or various other matters.

According to theſe accidents it may be thrown into a kind of method, under the terms Genus and Species, to great advantage. The obvious Characters giving an artificial method; and the conſideration of their Origin a natural one.

S P A R.

O R D E R I.

Retaining its natural Figure.

G E N U S I.

P U R E S P A R.

R H O M B I T E S.

Spar in form of Rhombs.

This is either pure as it concretes alone; or variouſly ſtain'd and colour'd by admixtures.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. SOFT SPAR.							Rhomboides Islandica. N.
Small Rhombs	tender	very heavy	glossy	COLOUR-LESS.	soft	Hartz forest	a delicate, but weak lime.
2. ICELAND SPAR.							Spatum Speculare Duplicans. L.
Large Rhombs	friable	heavy	glossy	COLOUR-LESS.	smooth	Iceland, Switzer-land, &c.	double refraction.
3. MILKY SPAR.							Spatum Compactum. L.
Irregular Rhombs	brittle	very heavy	dull	MILKY WHITE	rugged	Derbyshire	lime.
4. TOPAZ SPAR.							Spatum Speculare Flavescens. L.
Connected Rhombs	hard	very heavy	crystaline	PALE YELLOW	fatty	Germany	false gem.

5. GARNET SPAR.							Spatum Rubrum Compactum. L.
Confus'd Rhombs	ſoft	heavy	dull	STRONG RED.	uneven	Yorkſhire	Spatum Speculare Vireſcens.
6. EMERALD SPAR.							
Small Rhombs	hard	heavy	bright	GREEN	ſoft to the touch	Germany	falſe gem. Spatum Speculare Cœruleſcens. L.
7. SAPPHIRE SPAR.							
United Rhombs	very hard	heavy	perfectly poliſhed	PALE BLUE	dry	Germany	falſe gem. Rhombites Opalina. N.
8. OPALINE SPAR.							
Connected Rhombs	brittle	very heavy	clouded	CHANGE-ABLE GREY	ſoft	Brazils	falſe gem. Spatum Compactum Flaveſcens. L.
9. YELLOW RHOMBIC SPAR.							
Rude maſſes breaking in Rhombs.	friable	heavy	ſcaly	DULL YELLOW	glimmer-ing.	Norway, England	lime.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
10. BLUE GREEN RHOMBIC SPAR.							Spatum Compactum Virescens. L.
Rough Lumps	ſhattery	light	cracky	POOR GREEN	wavy	Germany	lime.
11. ORANGE SPAR.							Rhombites Aurantiaca. N.
Large Rhombs	ſhattery	heavy	crackled	ORANGE COLOUR	ſtreaky	Germany	
12. BROWN RHOMBIC SPAR.							Alumen Quartzoſum. L.
Great rude Lumps	ſhattery	heavy	irregular, flaky	LIGHT BROWN	harſh	England	lime.
13. BLACK RHOMBIC SPAR.							Le Spath Cubique Noiratre. W.
Small connected Rhombs	very hard	very heavy	ſcaly	BLACKISH	hard	Cornwall	a tin ore

S P A R.

O R D E R II.

Affecting the Figure of Talc.

G E N U S I.

P L A T E D S P A R.

P A R O P S I S.

Spar formed into broad, flat Flakes.

Spar assumes this Figure after passing thro' beds of Talc.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLEAR FLAKY SPAR.							Spatum Fissile. L.
Irregular, large flakes	brittle	light	glossy	COLOUR-LESS	unequal	Norway	for windows.
2. WHITE FLAKY SPAR.							Spatum Aqueum Hartense. W.
Uneven cakes	very brittle	heavy	rough	MILKY	harsh	Sweden	lime.
3. WAVY SPAR.							Spatum Undatum. L.
Flat cakes	brittle	light	undulated	GREY	fatty	Denmark	lime.

S P A R.

O R D E R III.

Affecting the Figures of the Cryſtals.

F L U O R E S.

G E N U S I.

TWO-POINTED SPAR.

FLUOR BICUSPIDATUS.

Compoſed of two hexagonal Pyramids, with an intermediate hexagonal Column.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. SALBERG SPAR.							Fluor Bicuſpidatus Diaphanus. W.
Small	ſoft	very heavy	poliſh'd	COLOUR-LESS	bitumi-nous	the Salberg hills in Aſbeſtos	curioſity.
2. TAWNY SPAR.							Fluor Bicuſpidatus Martialis.
Large	hard	heavy	uneven	YELLOWISH	bitumi-nous	the Swediſh iron mines	curioſity.

S P A R.

ORDER III.

GENUS II.

CONNECTED SPAR.

FLUOR CONNEXUS.

Composed of two trigonal Pyramids, without any intermediate Columns.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. DIAMOND SPAR.							Dent des Cochons a deux Pointes. W.
Small	hard	very heavy	polish'd	PERFECTLY CLEAR	smooth	Ramelsberg	curiosity.

S P A R.

O R D E R III.

G E N U S III.

C O L U M N A R S P A R.

FLUOR COLUMNARIS.

Compoſed of a Column, terminated by a Pyramid.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. HEXAGONAL SPAR.							Spatum Cryſtaliſatum Hexangulare. W.
Long ſprigs	tender	heavy	gloſſy	WHITISH	flaky	Derbyſhire	curioſity.
2. TETRAGONAL SPAR.							Fluor Columnaris Tetragonus. N.
Thick ſprigs	hard	very heavy	flaky	YELLOWISH	rough	Yorkſhire, lead mines	lime.
3. TRIGONAL SPAR.							Fluor Columnaris Trigonus.
Short ſprigs	ſoft	heavy	ſcaly	RUDDY	uneven	foreſt of Dean	an iron ore.

S P A R.

O R D E R III.

G E N U S IV.

P R I S M A T I C S P A R.

FLUOR PRISMATICUS.

In form of an angulated Column, without a Pyramid.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR	QUALITIES.	PLACE.	USES.
1. SIX-SIDED SPAR.							Spatum Prifmaticum Hexangulare. W.
Coarfe fhoots	tender	heavy	rugged	BROWNISH	friable	Lancafhire	lime.
2. ABRUPT SPAR.							* Spatum Prifmaticum Truncatum. W.
A mafs of fhort pieces.	hard	very heavy	fmooth	RUDDY	confus'd together	Sweden	lime.
3. MANY-SIDED SPAR.							Spatum Cryftalifatum Tetradeca hædrum. W.
Short fprigs of fourteen fides	very hard	heavy	gloffy	YELLOWISH	uneven	Derbyfhire, lead mines	lime.

* Wallerius faw this fix fided: all my pieces are very ill determin'd in this article, breaking ill from the mafs.

S P A R.

O R D E R III.

G E N U S V.

PYRAMIDAL SPAR.

FLUOR PYRAMIDALIS.

In form of Pyramids, without any Column *.

* Thefe are ufually found in great clufters in the clifts of Rocks of Limeftone.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. POLYGONAL SPAR *.							Fluor Pyramidalis Polygonus.
A broad base and fourteen sides	hard	heavy	polish'd	YELLOWISH	in great clusters	Cornwall	a flux for ores.
2. ELEVEN EDG'D SPAR.							Spatum Pyramidale Endeca-hædrum. W.
Short	tender	very heavy	glossy	RUDDY	cluster'd	iron mines in the Hartz	an iron ore.
3. EIGHT SIDED SPAR.							Spatum Pyramidale Octa-hædrum. W.
Irregular masses	very hard	heavy	polish'd in some parts	YELLOWISH	clustery	lead mines, Derbyshire	lime.

* This seems the other half of the preceding Species, but always separate.

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S P A R.

ORDER III.

GENUS VI.

OBLIQUE SPAR.

SUILLUS.

In form of cluſter'd Priſms, cut off obliquely at the top.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. BROWN OBLIQUE SPAR.							Lapis Suillus Prismaticus. W.
Uneven clusters	tender	heavy	polished	DARK BROWN	stinking when rub'd	Germany, and Norway	a flux for ores.
2. RADIATED OBLIQUE SPAR.							Lapis Suillus Radiatus. W.
Uneven masses	soft	heavy	unequal	GREY	very stinking	Denmark	curiosity.
3. GLOBULAR OBLIQUE SPAR.							Lapis Suillus Sphericus. W.
Rounded masses	hard	heavy	botryoide	BRIGHT BROWN	sulphureous when struck	Norway	lime.

The Colour, as well as scent of these Spars, goes off in the fire: they require but a slight heat to render them as white and sweet as the other Spars: nor is it wonderful that sulphur should predominate so much in one kind, more than others. But 'tis singular, that the form of these Species is their own, and is indeed a certain Generic character; and that the abundant sulphur always attends it.

S P A R.

O R D E R IV.

C U B I C.

D R U S Æ.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLEAR CUBIC SPAR.							Spatum Cryſtalizatum Cubicum. W.
In great complex cluſters	ſoft	heavy	poliſhed	COLOURLESS	multitudes mix'd together rudely	Derbyſhire	lime.
2. BROWN CUBIC SPAR.							Druſa Fuſca.
In thick cluſters	hard	heavy	ſmooth	YELLOWISH BROWN	confus'd in cluſters	Cornwall	a flux for ores.
3. PURE WHITE CUBIC SPAR.							Druſa Lactea.
Small and diſtinct	ſoft	very heavy	gloſſy	PERFECTLY WHITE	looſe and free	Glouceſterſhire, in iron mines	curioſity.
4. GREY CUBIC SPAR.							Druſa Griſea.
Small cluſters	hard	heavy	ſcaly	GREY	connected, but not confus'd	Germany, in iron rocks	a flux.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
5. TAWNY CUBIC SPAR.								Drusa Fulva.
In great confus'd masses	brittle	very heavy	rugged	YELLOWISH BROWN.	confus'd clusters	Forest of Dean	a flux.	
6. PURPLE CUBIC SPAR.								Drusa Amethystina.
Small, and single	very hard	heavy	polish'd	AMETHYSTINE	distinct and perfect	Norway	curiosity.	
7. RED CUBIC SPAR.								Drusa Rubescens.
Separate cubes	hard	very heavy	glossy	FINE RED	pure and free	Spain	a gem.	
8. BLUE CUBIC SPAR.								Drusa Cærulea.
Loose clusters	tender	very heavy	polish'd	BRIGHT BLUE	connected, not perfect	North America, in copper mines	a false gem.	

9. DEEP-GREEN CUBIC SPAR.								Drusa Viridis.
Small clusters	soft	heavy	scaly	DEEP GREEN	small masses	Sweden	a flux.	
10. PURPLE CUBIC SPAR.								Drusa Violacea.
Distinct	soft	heavy	flaky	DEEP PURPLE	single	Germany	a flux.	
								Drusa Caruleo Virens.
11. AQUA MARINE CUBIC SPAR.								
Small clusters	tender	heavy	glossy	BLUE GREEN	distinct, tho' connected	Hartzforest	a flux for ores.	
12. EMERALD CUBIC SPAR.								Drusa Smaragdina.
Large clusters	hard	very heavy	polished	PERFECT FINE GREEN	connected	Norberg	a flux for metals.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
13. LEMON CUBIC SPAR.							Drusa Pallescens.
Vast masses	very soft	heavy	scaly	PALE, BUT DEAD YELLOW	confused	the Hartz	a flux for ores.
14. VIOLET CUBIC SPAR.							Drusa Violacea.
Distinct, and small	hard	heavy	polished	VIOLET COLOUR'D	scarce connected	Gisloff	a false gem.
15. BLACK CUBIC SPAR.							Drusa Nigra.
In large clusters	very hard	very heavy	glossy	BLACK	connected, not confused	France, where there is TIN	curiosity.
16. DEEP-GREY CUBIC SPAR.							Drusa Griseofusca.
Small clusters	soft	heavy	polished	DEEP GREY	confused	Cornwall	a flux.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
17. BLUE-GREY CUBIC SPAR.							Drusa Subcærulea.
Small clusters	hard	very heavy	glossy, but flaky	BLUE GREY	connected	Sandswaer, in Norway	a flux.
18. GARNET CUBIC SPAR.							Drusa Rusa.
Loose and free	soft	heavy	polished	FINE RED	scarce connected	Alsace	a false gem.
19. RUBY CUBIC SPAR.							Drusa Rubea.
Small clusters	hard	very heavy	glossy	BRIGHT RED	almost free	Schemnitz	a false gem.

Z

S P A R.

O R D E R V.

A N D R O D A M A N D E S P A R.

A N D R O D A M A S.

Oblong, and affecting the parallellopiped Figure.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE ANDRODAMANDE.							Androdamas Alba.
In large maſſes	very ſoft	heavy	poliſh'd	CHALKY	brittle	Sneeberg	lime.
2. YELLOW ANDRODAMANDE.							Spatum Pellucidum Flaveſcens. W.
Vaſt maſſes	tender	heavy	flaky	DULL YELLOW	ſhattery	America	lime.
3. TAWNY ANDRODAMANDE.							Spatum Pellucidum Croceum. W.
Great maſſes	ſoft	very heavy	gloſſy	BROWNISH YELLOW	brittle	Anderaſberg, in Germany	a good flux.

Form.	Hardness.	Weight.	Surface	Colour.	Qualities.	Place.	Uses.
4. BLACK ANDRODAMANDE.							Spatum Pellucidum Nigricans. W.
Small clusters	hard	very heavy	glossy	DEEP BLACK	brittle	Goffelaer, in Saxony	a tin ore.
5. GREEN ANDRODAMANDE.							Androdamas Smaragdinus Scheukz.
Small clusters	soft	heavy	polished	FINE GREEN	brittle	Swisserland	a false gem.
6. MARBLED ANDRODAMANDE.							Spatum Pellucidum Venosum. W.
Great masses	hard	very heavy	veiny	YELLOW, VEIN'D WITH RED AND BROWN	brittle	Swisserland	lime.

S P A R.

O R D E R VI.

I R R E G U L A R S P A R S.

SPATUM EFFLORESCENS.

Uncertain in its Angles, but throwing itſelf into complex elegant Forms.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. ROSE SPAR.							Spath Cryſtaliſée en Roſes. W.
Large roſe-like maſſes	tender	heavy	flaky	DEAD WHITE	hollow	Sweden, in lead mines	a flux.
2. HEDGE HOG SPAR.							Spati Echinorum Imperati.
Small maſſes	hard	light	unequal	GREYISH	convex	Italy	curioſity.
3. LAMELLATE SPAR.							Spatum Plexum Tetradecahædrum. W.
In vaſt flatted maſſes	hard	heavy	gill'd like muſh-rooms	WHITE	lightly convex	Germany	lime.
4. BROKEN SPAR.							Spatum Dimidiatum. W.
Great lumps	very hard	heavy	ſmooth	BROWNISH	form'd of half octagons	Sweden	a flux.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. DECUMBENT GRAPE SPAR.							Spatum Botryiticum. W.
Large clusters	soft	heavy	glossy, but rising in lumps	PALE BROWN	brittle	Sax Weissenfels, in Norway	lime.
6. CYLINDRIC SPAR.							Spatum Crystalisatum Cylindricum. W.
Great masses	soft	very heavy	glossy	PALE YELLOWISH	brittle	Bispberg, in Sweden	lime.
7. GLOBULAR SPAR.							Spatum Crystalisum Globosum. W.
Round lumps	hard	heavy	smooth	BROWNISH	firm	Hartz forest	lime.

S P A R.

O R D E R VII.

DEBASED SPAR.

SPATHURA.

Alter'd in its aſpect and qualities by a mixture of other matters.

G E N U S I.

SAND SPAR.

SPATHURA ARENACEA.

Granulated irregularly, and having an aſpect of lumps of Sand.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE SAND SPAR.							Spatum Arenaceum Album. W.
Rude maſſes	brittle	heavy	uneven, and irregular	GREYISH WHITE	compoſed of various ſiz'd particles	Twyebrook, in Sweden	a flux.
2. YELLOW SAND SPAR.							Spatum Arenaceum Cinereum. W.
Small clumps	ſhattery	heavy	uneven	BROWNISH, YELLOW, AND GREY	confuſed, and coarſe	Germany	a flux.
3. RUDDY SAND SPAR.							Spatum Arenaceum Rubrum. W.
Rough lumps	very hard	very heavy	uneven, and rough	DEEP RED	irregularly mixed	Foreſt of Dean	a flux.

S P A R.

O R D E R VI.

G E N U S II.

GLASS SPAR.

SPATHURA VITREA.

Glaſſy, firm, ſolid, and ſhapeleſs.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLEAR GLASS SPAR.							Spatum Scintillans. L.
Large nodules	very hard	heavy	uneven, but gloſſy	COLOUR-LESS	breaking into rude cubes	Stalberg	curioſity.
2. GREY GLASS SPAR.							Spatum Lateribus Nitidis. W.
Rude Lumps	very hard	heavy	poliſh'd, but uneven	GREYISH WHITE	breaks in angulated frag-ments.	Hartz foreſt	curioſity.

S P A R.

ORDER VI.

GENUS III.

PYRITIC SPAR.

SPATHURA PYRIMICHA.

Irregular, botryoide, and ſtriated.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. RUDDY PYRITIC SPAR.							Spatum Pyrimachum Rubrum. W.
Oblong lumps	brittle	very heavy	raiſed in bumps	RUDDY BROWN	ſulphureous, when broken	Foreſt of Dean	curioſity.

All the debaſed Spars have more or leſs of various mixtures in them, and therefore manifeſt their characters as Spar, leſs freely; but there is always more or leſs of the calcarious quality in them; and when broken, if not while whole, they ſhew ſomewhat of the cubic form in their particles.

S P A R.

O R D E R VII.

CURTAIN'D SPAR.

STIRIA.

Hanging over the walls of caverns in form of folded curtains.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. PURE CURTAIN'D SPAR.							Stiria Decolor.
Vast sheets	brittle	heavy	polished, and glittering	COLOUR-LESS	flaky, when broken	Grotto of Antiparos	for slabs and ornaments.
2. YELLOW CURTAIN'D SPAR. ORIENTAL ALABASTER.							Stiria Flaveiaces.
Wav'd sheets	tender	heavy	polished, and undulated	PALE YELLOW, VARIOUSLY VEIN'D	breaks in streaky flakes	Ægypt; also Cornwall	for ornaments.

4	3. PURPLE CURTAIN'D SPAR. ROOT OF AMETHYST.							Stiria Amethyſtina.
	Thick coats	hard	heavy	uneven, but gloſſy	GREY, BLOTCH'D WITH PURPLE, OR OTHER COLOURS	breaks unevenly, and crackly	Derbyſhire	for ornaments.
	4. WATER SPAR.							Stiria Fulca.
	In cruſts in tea-kettles	brittle	light	uneven, and rough	DIRTY GREY	ſtriated	every where	none.
	5. AERIAL SPAR.							Stiria Aeria.
	Fine coats	hard	heavy	ſmooth, and even	BROWNISH YELLOW	ſtriated, when broken	in the pipes of fire engines in the Corniſh mines where only vapour comes	curioſity.

S P A R.

ORDER VIII.

STALACTITICAL SPAR.

STALACTITES.

In form of Icicles hanging from the roofs of caverns.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE STALACTITE.							Stalactites Albus.
Long cones	brittle	heavy	uneven, but polished	WHITISH	flaky, when broken	roofs of caverns, Antiparos, and Derbyshire	an ornament for grottos.
2. GREY STALACTITE.							Stalactites Griseus. W.
Thick cones	hard	heavy	rumpled, and uneven	GREYISH	shattery	limestone caverns, Derbyshire	for grotto work.
3. CHALKY STALACTITE.							Stalactites Cretaceus.
Coarse cones	soft	light	wav'd, and rumpled	PURE WHITE	dusty, when broken	vaults and arches, Windsor, &c.	for grottos.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
4. RED STALACTITE.							Stalactites Ruber. W.
Short cones	brittle	very heavy	wav'd	RED	irregular, when broken	Derbyſhire	none.
5. BLACK STALACTITE.							Stalactites Niger. W.
Slender cones	very hard	heavy	rumpled	DEEP BLACK	flaky, when broken	Grapenberg, in Sweden	for grottos.
6. FOLIACEOUS STALACTITE.							Stalactites Feuillette. W.
Thick cones	ſoft	heavy	uneven, and as it were leafy	YELLOWISH	thin flakes, broken	Hartzforeſt	for grottos.

S P A R.

O R D E R IX.

STALAGMITIC SPAR.

STALAGMITES.

Form'd into globular Figures, coated as an Onion.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.	
1. SUGAR-PLUM STALAGMITE.								Stalagmites Orobias. W.
Small, round lumps	soft	heavy	scaly	PURE WHITE	thin coated	Italy	curiosity.	
2. GREY STALAGMITE.								Pisolithus. W.
Round lumps	hard	heavy	bubbled	BROWNISH GREY	thick coated	Sweden	lime.	
3. OVAL STALAGMITE.								Orobias Scheuk.
Small, oval lumps	tender	heavy	smooth	YELLOWISH	crackly	Zweybreck, in Sweden	lime.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
4. FISH-SPAWN STALAGMITE.							Meconites Scheuk.
Great ſtony maſſes, of little oval lumps	ſoft	light	ſmooth	WHITISH	tender	Ketton, in Rutland	a building ſtone.
5. SAND STALAGMITE.							Ammites. B.
Stony maſſes of ſmall grains	hard	heavy	rugged	REDDISH	ſhattery	Cornwall	a flux.
6. BLACK STALAGMITE.							Cenchrites Niger Scheuk.
Small maſſes	very hard	heavy	ſcaly	DEEP BLACK	thin coated	Nerike, in Sweden	a flux.

S P A R.

ORDER X.

INCRUSTING SPAR.

INCRUSTATIO.

Forming a ſtony coat upon moſs, or ſhells, or other ſubſtances.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. BROWN INCRUSTING SPAR.							Incruſtatio Fuſca.
A thin coat	very ſoft	light	rugged	PALE BROWN	brittle	Yorkſhire, in waters	curioſity.
2. GREY INCRUSTING SPAR.							Incruſtatio Albida.
A thick coat	hard	heavy	wavy	GREYISH	firm	Sweden, on ſhells	curioſity.
3. RUDDY INCRUSTING SPAR.							Incruſtatio Rubeſcens.
Rude coats	tender	very heavy	uneven	REDDISH	brittle	foreſt of Dean	curioſity.

THESE, ſo far as I have yet ſeen, are all the Species of Spar: but ſo many there are; and thus they may be arranged in a cabinet. They are more than is uſually thought: but the eye ſhews them; and their exiſtence cannot be diſputed.

If the term Species be queſtion'd, and it be ſaid, that many here called ſuch, are only Varieties; I cannot agree to that term as a ſubdiſtinction, tho' many, and great names ſupport it. I ſhould be ſorry, any of thoſe Authors entered into a diſpute about it; for I ſhould be obliged to tell them, that there is no real diſtinction of Species in Spar. Spar is but one body, and all its appearances are Varieties: however, the numbering them as Species, fixes their names; and aſcertains the account, without the confuſion of a uſeleſs ſubdiſtinction.

NATURAL METHOD of SPARS.

The ORIGINATION of their FORMS and COLOURS,

according to the Course they have run before Concretion.

Heavy watery Vapour — Mineral Acid — Acidulated Water — Bitumen — Sulphur — Limestone — SPAR.

Heavy watery Vapou — Mineral Acid — Acidulated Water — Bitumen — Sulphur — Limestone — SPAR.

- This running thro'
  - 1. Earths, simple and superficial
    - Chalky — becomes Spatum Compactum. L.
    - Yellow Ochreous — — Spatum Speculare Flavescens. L.
    - Red Ochreous — — Spatum Rubrum Compactum. L.
  - 2. Ores —
    - of Copper
      - Armenus — — — Spatum Speculare Virescens.
      - Malachitis — — — Spatum Speculare Cœrulescens. L.
      - Fahlertziana — — — Rhombites Opalina.
    - of Lead
      - Galena — — — Spatum Compactum Flavescens. L.
      - Virens — — — — Spatum Compactum Virescens. L.
      - Compactum — — — Rhombites Aurantiaca.
    - of Antimony — — — — Alumen Quartzosum. L.
    - of Tin — — — — — Le Spath Cubique. W.
  - 3. Saline deep lodged Earths
    - Vitriolic — and then thro'
      - Calx Nativa — — — Fluor Bicuspidatus Diaphanus. W.
      - Ferrum Spatosum — — Fluor Bicuspidatus Martialis. L.
      - Lithomarga — — — Dent des Cochons à Deux Pointes. W.
      - — — — — Spatum Crystalisatum Hexangulare. W.
    - Aluminous
      - Calaminaris Ferruginea — Fluor Columnaris Tetragonus. W.
      - Pyrites Ferri — — — Fluor Columnaris Trigonus.
      - Auripigmentum — — Spatum Prismaticum Hexangulare. W.
      - Pyrites Cupri — — — Spatum Prismaticum Truncatum. W.
      - Ferrum Arenosum — — Spatum Crystalisatum Tetradeca-hædrum. W.
    - Muriatic
      - Plumbum Galæna — — Fluor Pyramidalis Polygonus.
      - Stibium Striatum — — Spatum Pyramidale Endeca-hædrum. W.
      - Plumbum Spatosum — Spatum Pyramidale Octa-hædrum. W.
    - Natrane
      - the Brown Drusa Fusca
      - the White Drusa Lactea
      - the Pure Spatum Crystalisatum Cubicum. W. — and this running thro'
        - Ferrum Calcareum — Drusa Fulva.
        - Cuprum Schistosum — Drusa Amethystina.
        - Cuprum Nikelum — Drusa Cœrulea.
        - Cuprum Lazuli — — Drusa Viridis.
        - Cuprum Coraceum — Drusa Violacea.
        - Plumbum Spatosum — Drusa Cœruleo-virens.
        - Plumbum Virens — Drusa Smaragdina.
      - the Grey Drusa Grisea
- This running thro'
  - Rhombites
  - Pellucida
  - By flower Concretion
  - Spatum Speculare Duplicans
  - This running thro'
    - 3b. Saline deep-lodged Earths
      - 4b Natrane Pure — becomes
        - Spatum Cristalisatum Cubicum. W. — and this thro'
          - Ferrum Tessulare becomes Drusa Pallescens.
          - Plumbum Compactum Drusa Violacea.
          - Bismuthum — — Drusa Nigra.
          - Molybdœna Plumbago Drusa Griseo-fusca
          - Argentum Album — Drusa Subcœrulea.
          - Ferrum Hepaticum — Drusa Rufa.
          - Aurum Marcasiticum — Drusa Rubea.
          - Argentum Rubrum — Drusa Rubescens.
    - 4. Selenites — — —
      - Gypsum Opacum — — Androdamas Alba.
      - Lapis Hepaticus — — Spatum Pellucidum Flavescens. W.
      - Selinites Flavus — — Spatum Pellucidum Croceum. W.
      - Hepaticus Niger — — Spatum Pellucidum Nigricans. W.
      - Gypsum Virens — — Androdamas Smaragdinus. Scheukz.
      - Selinites Versicolor — Spatum Pellucidum Venosum. W.
    - 5. Sand Stone — — — then thro'
      - Creta Rara — — — Spatum Arenaceum Album. W.
      - Guhr Cinereum — — Spatum Arenaceum Cinereum. W.
      - Ferrum Commune — — Spatum Arenaceum Rubrum. W.
    - 6. Sulphurs — — —
      - Crystalinus — — — Lapis Suillus Prismaticus. W.
      - Pyrites Figuratus — — Lapis Suillus Radiatus. W.
      - Nativus — — — Lapis Suillus Sphericus. W.
    - 7. Talc — — —
      - Talcum Aureum — — Spatum Undatum. L.
      - Ollaris — — — — Spatum Aqueum Hartense. W.
      - Talcum Albicans — — Spatum Fissile. L.
    - 8. Cos Quadrum — Spatum Lateribus Nitidis. W. — then thro'
      - Quartzum Lacteum Spatum Crystalisum Globosum. W.
      - Quartzum Fissile Spatum Crystalisatum Cylindricum. W.
      - Quartzum Opacum Spatum Botryiticum. W.
    - 9. Crystal Beds — then thro' Earths
      - Spatum Scintillans. L.
        - Marga Cretacea — — Spatum Dimidiatum. W.
        - Leucargilla Cinerea. W. Spatum Plexum Tetradecahædrum. W.
        - Argilla Fusca — Spati Echinorum Imperati.
        - Argilla Pallida — Spath Crystalisée en Roses. W.
- With a slow Course, after long Rest, thro'
  - 15. Earths — —
    - Humus Rubra. W. — Incrustatio Rubescens.
    - Creta Mollis — — — Incrustatio Albida.
    - Humus Atra — — Incrustatio Fusca.
  - 16. Calcareous Stones
    - L. Calcareus Niger. W. — Cenchrites Niger. Scheuk.
    - L. Calcareus Albus. W. — Ammites. B.
    - L. Calcareus Griseus. W. Meconites. Scheuk.
    - L. Calcareus Undulatus. W. Orobias Scheuk.
    - L. Calcareus Stratosus — Pisolithus. W.
    - L. Calcareus Fuscus — Stalagmites Orobias. W.
- With Coldness, and a slow Course, after long Rest, thro'
  - 10. Alabaster — —
    - Alabastrum Durum. W. — Stalactites Feuillette. W.
    - Alabastrum Maculis Nigris Stalactites Niger. W.
    - Alabastrum Oychites — Stalactites Ruber. W.
    - Alabastrum Candidum — Stalactites Cretaceus.
  - 11. Marble — —
    - Pierre à Chaux Blanc — Stiria Fusca.
    - Marbre Rouge — — Stiria Amethystina.
    - Marbre Jaune. W. — Stiria Flavescens.
    - Marbre Blanc — — Stiria Decolor.
  - 12. Lime — — — — — — — Stalactites Griseus. W.
  - 13. Chalk — — — — — — — Stalactites Albus.
  - 14. Or raised by Heat in Vapour — — Stiria Aeria.

NATIVE FOSSILS.

CLASS IV.

CRYSTAL.

CRYSTALLUS.

A pure Foſſil, bright, glaſſy, not fiſſile, nor breaking into regular forms.

IT has been ſaid that Cryſtals break into Columns, as Spar breaks into Rhombs; but 'tis not ſo: the trial is eaſy; and will contradict the aſſertion: Spar is formed of connected Rhombs; Cryſtal is as a maſs of melted glaſs.

Like Spar, or Selenite, it is one thing; what are called Species, are varieties; and theſe varieties ariſe from accidents, and are not in the nature of the body.

The natural place of Cryſtal is in the clefts of rocks: but only of ſuch rocks as have a cryſtalline matter for their baſe. No man ever ſaw Cryſtal in the fiſſure of a limeſtone rock, or Spar in a cryſtalline one.

It ſometimes lines theſe cavities with a pure wall of ſeeming glaſs; ſometimes even fills the fiſſure with one vaſt maſs; and when rendered foul by great quantities of earth, it forms whole rocks, whole mountains.

Theſe ſplitting, water waſhes it pure again into the cracks; and thus is the eternal circle kept in being.

Pure Cryſtal that has connected ſlowly, 's colourleſs, pellucid, and of an angulated form; a P iſm, with a Pyramid at each end; this is its proper ſhape: but as it has been diſturbed in its formation, or fouled with mixtures, it aſſumes variouſly angulated Figures; or forms maſſes not angular; and loſes of its tranſparency, and gains new colours.

Under this variety of appearances, it is to be conſidered in the arrangement of a cabinet; and thus its forms are to be laid down here: thoſe who pleaſe may call them Species; thoſe who chuſe may enter them as varieties, or diſpute about the vanity of terms: here they are laid down only as ſo many numbered appearances of the one thing Cryſtal, and reckoned as no other. They will be beſt underſtood by diſtributing them into various Orders, according to their general marks of difference; and ſo much we allow: the reſt is folly.

CRYSTALS.

CRYSTALS.

ORDER I.

Of angulated Figures.

TRIBE I.

In form of a Prism of six sides, terminated by a Pyramid of six sides, at each end.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. PURE CRYSTAL*.							
Slender	very hard	heavy	bright, and polish'd	TRANSPARENT, AND COLOURLESS	pure	Bristol	Crystal de Roche à deux Pointés. W. glass.

* This differs in nothing from the form of pure Spar, but that the points are perfect and sharp here, never in the Spar.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
2. TOPAZ *CRYSTAL.							Nitrum Lapidosum Flavum. L.
Short	hard	very heavy	glossy	YELLOW	very pure	the Brazils, and Bohemia	a gem.
3. HYACINTHINE *CRYSTAL.							Nitrum Lapidosum Purpurofulvum. L.
Long, and slender	hard	heavy	polish'd	FLAME COLOUR'D	pure	Sweden	gem.
4. BERYLL CRYSTAL.							Nitrum Lapidosum Cyaneum. L.
Small	very hard	heavy	glossy	BLUE GREEN	watery	Germany	gem.

* These are called by some the occidental Gems, occidental Topaz, and the rest: but they are nothing but coloured Crystal; the most perfect and finest of them keep the proper form of the Prism, with two Pyramids; but as they have concreted hastily, or been mixt with less pure matter in concretion, they lose of their Figure, keeping sometimes only one of the Pyramids, or in some scarce any angulated form; but still they are to be known by their brightness, and according to their colours.

5. SAPPHIRE CRYSTAL.							Nitrum Lapidosum Cæruleum. L.
Thick	hard	heavy	polished	FINE BLUE	bright	Bohemia	gem.
6. EMERALD CRYSTAL.							Nitrum Lapidosum Viride. L.
Long	tender	heavy	bright, and glossy	PURE GREEN	cloudy in parts	Swisserland	gem.
7. RUBY CRYSTAL.							Nitrum Lapidosum Rubrum. L.
Short and thick	very hard	heavy	lineated	FINE RED	perfectly pure	Peru	gem.
8. AMETHYSTINE CRYSTAL.							Nitrum Lapidosum Violaceum. L.
Short and thick	tender	very heavy	polished	PURPLE	cloudy in part	Bohemia	gem.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
9. BROWN CRYSTAL.							Nitrum Lapidosum Nigricans. L.
Thick	very hard	heavy	streaky	DULL BROWN	clear	Norway	for seals.
10. WHITE CRYSTAL.							
Large	tender	lighter	smooth	WHITISH	cloudy	Gloucester-shire	glass.
11. BLACK CRYSTAL.							Crystallus Nigricans. Bom.
Small	very hard	heavy	glossy	PERFECTLY BLACK	opake	Bristol	grottos, glass

CRYSTALS.

ORDER I.

TRIBE II.

In form of a Prism of six sides, with a Pyramid at one end; and fixed to the Rock at the other.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. PURE SPRIG CRYSTAL.*							Nitrum Lapidosum Oblongum. L.
Large	hard	heavy	glossy	COLOUR-LESS	perfectly pellucid	every where in rocks	grottos.

* This is found coloured in all the dyes of the preceding. Those Specimens should be arranged under the pure, as in that Species; but they can have no new name; they are to be called Topaz Crystal, as the former. There must be but one name for them, and those; for they are but one thing in nature and in construction, tho' the forms differ.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
2. BROAD SPRIG CRYSTAL.							* Nitrum Quartzosum Lateribus duobus latioribus. L.
Large	hard	very heavy	polished	WATERY	cloudy	Bristol	glass.
3. NARROW SPRIG CRYSTAL.							
Small, and long	hard	very heavy	glossy	WHITISH	foul	Forest of Dean	glass.
4. LONG SPRIG CRYSTAL.							Crystallus Planis Intermediis Majoribus Steno.
A small, long column	very hard	heavy	bright	COLOUR-LESS	perfectly pellucid	Swisserland	glass.
5. SHORT SPRIG CRYSTAL.							Nitrum Lapidosum Subacaule. L.
A thick, short column	hard	heavy	rugged	WHITISH	cloudy	Germany	glass.

* Linnæus has been free in the use of the name, Nitre, for these Crystals; for by his plan they are kinds of Nitre. I love and honour him, but can't adopt this Salt System. I hate to contradict a Genius of so vast merit; but we must by that freedom, come at real knowledge. It is not Nitre Crystal most emulates in its form: 'tis the vitriolated Tartar that Crystal resembles; an artificial, not a natural Salt.

CRYSTALS.

TRIBE III.

In form of Pyramids, without a Column.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. CLEAR DOUBLE CRYSTAL.							Nitrum Lapidosum Acaule. L.
Two short pyramids, base to base	hard	heavy	glossy	COLOURLESS	pellucid	Sweden	glass.
2. BROWN DOUBLE CRYSTAL.							
Two thick pyramids	hard	heavy	lineated	PALE BROWN	pellucid	Grenades	glass.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. LOW CRYSTAL. *							
A pyramid fixt to rock	very hard	heavy	bright, and glossy	COLOUR-LESS	pellucid	Bristol	grottos.

* Of this form also there are occidental Gems; they should be ranged under this, in a cabinet, as varieties of this variety, but they can have no other names than the first, because they are no other thing.

All these kinds of Crystal are best understood when we find them single, but they are most frequent in clusters; the single ought to be placed first in each kind, and the clustered to follow.

CRYSTALS.

TRIBE IV.

Angulated Crystals, fouled.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. COATED CRYSTAL.							
A covered column	hard	heavy	very rugged	RED OR GREEN	colourless when the coat is off	Cornwall	Nitrum Lapidosum Opacum. L. grottos.
2. WATER CRYSTAL.							
A column with a drop in it	hard	light	glossy	COLOUR-LESS	streaky	Germany	curiosity.
3. HOLLOW CRYSTAL.							
A column empty and hollow	hard	heavy	polished	WHITISH	watery	Swisserland	Nitrum Lapidosum Inane. L. curiosity.
4. TALCY CRYSTAL.							
A column	hard	heavy	glossy	COLOUR-LESS	with spangles of Talc within	Germany	curiosity.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
5. ASBESTINE CRYSTAL.							
A thick column	hard	heavy	lineated	PELLUCID	fibres of Asbestus within	Sweden	curiosity.
6. MARCASITE CRYSTAL.							
A column	hard	heavy	streaky	CLEAR	spangles of marcasite within	Germany	curiosity.
7. ANTIMONIATE CRYSTAL. *							
A coarse column	hard	heavy	rugged	WHITISH	with antimony ore in it	Sweden	curiosity.

* There may be more of these, and they should have their places after them. These are all I have seen: and 'twill be well if those who fancy others, will attend to Cronstedt's caution, and see they do not take Asbestus for grass, and earth for moss.

CRYSTALS.

ORDER I.

TRIBE V.

SANDS.

ARENÆ.

Broken; irregularly angulated, and in form of powder.

1. PURE SANDS.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. PURE CRYSTALLINE SAND.							
Large duſt	hard	heavy	gloſſy	COLOUR-LESS	angulated	Perſia	Arena Mobilis a. L.
2. ROUND CRYSTALLINE SAND.							
Round granules	hard	heavy	rough	COLOUR-LESS	rounded	the Mediterranean ſhores	Arena Mobilis ß. L.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
3. VOLATILE SAND.							
Fine duſt	ſoft	light	duſty	WHITISH	angulated	Arabia	Arena Mobilis γ. L.
4. ORANGE SAND.							
Large grains	hard	heavy	rugged	ORANGE-COLOUR'D	coarſe	Surinam	Arena Colorata α. Lin.
5. WHITISH SAND.							
Rough particles	hard	heavy	rugged	WHITE	opake	Hertford-ſhire	Arena Colorata β. L.
6. PALE YELLOW SAND.							
Irregular grains	hard	heavy	rugged	PALE YELLOW	foul	every where	Arena Colorata γ. L.

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7. RED SAND.							Arena Colorata δ. L.
Large grains	hard	heavy	ſmooth	DULL RED	clear	ſhores of Red Sea	
8. VIOLET SAND.							Arena Colorata ε. L.
Large grains	hard	heavy	poliſhed	PURPLE	bright	ſhores of the Baltic	
9. PALE SAND.							Arena Lacuſtris. L.
Great granules	hard	heavy	ſmooth	PALE YELLOWISH BROWN	rounded grains	ſhores of rivers	
10. HILL SAND.							Arena Campeſtris. L.
Irregular grains	hard	heavy	uneven	BROWNISH GREY	ſome rounded grains	high grounds and woods	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
11. COATED SAND.								
Large grains	ſoft	heavy	coated with earthy ſhells	WHITE	rounded grains	Sweden		Arena Margarita. L.
12. HEATH SAND.								
Very ſmall grains	ſoft	light	duſty	REDDISH GREY	rudely angulated	Heaths every where		Arena Glarea. L.
13. OCHREOUS SAND.								
Small grains	ſoft	light	rough	YELLOW	angulated	near ferruginous ſprings		Arena Ochracea. L.
14. FLINTY SAND.								
Great particles	harſh	heavy	poliſhed	HORN COLOUR'D	angulated	England		Arena Silicea. L.

2. MIX'D SANDS.

15. RUSTIC SAND.							Arena Ruſtica. L.
Rude particles	harſh	light	rugged	BROWN, AND GREY	mix'd of broken ſtone, and ſand	Suſſex, Sweden	
16. RUGGED SAND.							Arena Sabulum. L.
Unequal particles	harſh	light	rough	BROWN, AND WHITE	of ſtone, ſand, and talc	Sweden	
17. CASSERITE SAND.							Arena Caſſerita. L.
Fine particles	ſoft	light	ſmooth	MILKY WHITE	ſpangles of glimmer	Caſſerite Iſland	
18. YELLOW GLIMMER SAND.							Arena Micacea Aurea. L.
Small particles	ſoft	light	gloſſy	GOLD YELLOW	of yellow mica, and ſand	Sweden	

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
19. WHITE GLIMMER SAND.							Arena Micacea Argentea. L.
Small particles	soft	light	glossy	SILVERY WHITE	of white mica, and sand	Sweden, Germany	
20. GOLD SAND.							Arena Aurea. L.
Uneven particles	harsh	heavy	shining	YELLOWISH	grains of pure gold	Africa, and East Indies	for gold.
21. IRON SAND.							Arena Ferrea. L.
Sharp particles	hard	heavy	glittering	BLACK	angulated and flatted particles	Italy, Sweden	for writing.
22. GRANITE SAND.							Saburra Granatica. H.
Rude particles	harsh	heavy	shining	MIXT OF WHITE, RED, GREEN, &c.	of fragments of granites	Minorca, &c.	

23. PORPHYRY SAND †.								Saburra Porphyrina. H.
Unequal parts	hard	heavy	ſmooth	MIXT OF PURPLE, WHITE, &c.	compoſed of fragments of porphyry	Ægypt		
3. SHELLY SANDS.								
24. ÆGYPTIAN HOUR-GLASS SAND ‡.								Arena Ægyptiaca. N.
Unlike particles	ſoft	light	dull	BROWN, AND WHITE	mix'd of cryſtal, talc, and broken ſhells	Ægypt		

† Theſe are formed of fragments of Granite, Porphyry, and other Stones, beaten to powder, one againſt another. They are not genuine Sands, and there may be as many kinds enumerated as there are Stones; but theſe in their genuine ſtate, will have their place hereafter.

‡ This, and the three following, are now firſt known to me; the gift of my great patron. They are objects for the microſcope, and of the very fineſt kind; they are full of minute, but perfect ſhells; many of them Species, not otherwiſe known.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
25. CHIOZAN SAND.							Arena Chiozana.
Moſt unlike particles	harſh	light	ſhining	BLACK, WHITE, AND REDDISH	of cryſtal, iron, ſand, jet, marcaſite, and entire ſmall ſhells	Italy	
26. RIMINIAN SAND.							Arena Riminiana. N.
Very large, unlike particles	harſh	light	glittering	BLACK, AND WHITE	of cryſtal, iron, ſand, jet, corals, and entire ſhells	Rimini	
27. BONONIAN SAND.							Arena Ammonifera. N.
Foul particles	ſoft	light	dull	YELLOWISH	of cryſtal, talc, clay, and ſmall ammonitæ	Italy	

CRYSTALS.

ORDER II.

In maſſes not angulated.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. PEBBLE CRYSTAL.							Quartzum Purum Cronſtedt.
A round lump	hard	heavy	wavy	COLOUR-LESS	pellucid	Braſils, &c.	ſpectacles.
2. WHITE PEBBLE CRYSTAL.							Quartzum Pingue Cronſtedt.
Round ſtones	hard	heavy	uneven	WHITISH	watery	Sweden	glaſs.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. BLUE PEBBLE CRYSTAL.							Quartzum Cæruleum Cronstedt.
Small lumps	very hard	heavy	smooth	PALE BLUE	clear	Island of Uto	a false gem.
4. AMETHYSTINE PEBBLE CRYSTAL.							Quartzum Amethystinum Cronstedt.
Large lumps	hard	heavy	glossy	VIOLET PURPLE	clear	Island of Uto	a false gem.
5. SANDY PEBBLE CRYSTAL.							Quartzum Granulatum Cronstedt.
Great lumps	very hard	very heavy	granulated	MILKY	cloudy	Sweden	glass.
6. GREENISH PEBBLE CRYSTAL.							Quartzum Granulatum Virescens Cronstedt.
Small lumps	hard	heavy	rugged	PALE GREEN	clear	Sweden	glass.

7. SHATTERY PEBBLE CRYSTAL.							* Quartzum Spatosum Cronstedt.
Vast masses	hard	very heavy	rugged	WHITE	breaks into broad Plates	Sweden	glass.
8. YELLOW SHATTERY CRYSTAL.							Quartzum Spatosum Flavum Cronstedt.
Vast masses	very hard	heavy	uneven	PALE YELLOWISH BROWN	flaky	Gold mines of Hungary	glass.
9. BLOCK CRYSTAL.							
Vast stones	very hard	heavy	uneven	WHITISH	clear	Germany, in cracks of rocks	glass.
10. CURTAIN CRYSTAL.							
Vast sheets	hard	heavy	undulated	CLEAR AND COLOURLESS	watery	Persia	glass.

* The names of authors run out to an immoderate length; those I give from them mark the difference of kind, and are a sort of rendering them from Specific, into Trivial; this may serve as an instance: the words Quartzum Spatosum are not in Cronstedt, but whoever turns to his chapter of Quartzum, and finds the name Quartzum Textura Spatosa, will know 'tis that quoted here, and spare the Textura, I hope, with pleasure.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
11. BLACK PEBBLE CRYSTAL.							
Vast lumps	very hard	very heavy	botryoide	BLACK	crackly	Sweden	Quartzum Ferreum Cronstedt. an iron ore.
12. RUDDY PEBBLE CRYSTAL.							
Great masses	hard	very heavy	irregular	DULL RED	crackly	Smoland	Quartzum Cupro Mixtum Cronstedt. a copper ore.
13. JACOBINE PEBBLE CRYSTAL.							
Round lumps	very hard	heavy	wav'd	VEIN'D BLACK AND WHITE	dull	Sweden	Quartzum Aqueolacteum. W.
14. WORM-EATEN PEBBLE CRYSTAL.							
In sieve-like masses	hard	heavy	rugged	BROWNISH	eaten in holes as it were	Germany	Lutum Strab.
15. RIDG'D PEBBLE CRYSTAL.							
In rounded	hard	very heavy	ridg'd	BROWNISH RED	raised in edges	Germany	Quartzum Granatum. W.

NATIVE FOSSILS.

CLASS V.

GEMS.

Hard, bright, ſparkling; in ſmall angulated maſſes; compoſed of fine Plates.

THE Gems are naturally angular, as are the Cryſtals: but like them, from various accidents in their formation, they are found ſometimes in rude or ſhapeleſs maſſes; and when angular, they have ſtill all that variation of Figure which we ſee take place in Cryſtal and Spar; from the different diſturbances of their cryſtalization. In all theſe caſes the various number of angles may be occaſioned, as we ſee in Salts, from the accidents of their concretion. In theſe, as well as in thoſe, we have the ſame kind in different Figures; and as we can cryſtalize them under the eye, we can determine the cauſes of thoſe alterations. The round, or pebble Gems, ſeem not to have been original in that form, but worn to it by rolling about in a fluid.

The hardneſs and the luſtre of the Gems, muſt diſtinguiſh them from all other Stones; for if we conſidered their form, as their eſſential character, many Cryſtals would aſſume the name: and Cronſtedt

has well determined, that a certain Spar he had ſeen in Figure of the moſt regular Diamond, muſt then be call'd, a Diamond.

No peculiar conſtruction, no form of conſtituent parts is viſible in the Gems: they appear as maſſes of uniform nature; and they break irregularly and indeterminately; yet there is in all a really plated ſtructure. The Lapidaries find this in ſome, and can ſplit them; the burning glaſs diſcovers it in the reſt; and when turned to it in a right direction, tears them to pieces: they ſplit into the thinneſt Plates that can be conceived, and ſeem to have been compoſed in the manner of the Talcs, only more compact. 'Tis pity this character is not more obvious: for it affords a real diſtinctive mark between the Gems, and all other Stones: Cryſtals, which ſeem to come neareſt to them, have it not.

Their colours are leſs eſſential, for they can in moſt be driven away by fire; and nature ſometimes gives the Gem without them; they are evidently owing to the metals; for we can by means of metals, give the ſame to glaſs; our artificial Gem.

The Salt Syſtem of Linnæus appears here almoſt ludicrous. To a truly philoſophic eye, the difference of eſtimation and price are nothing; but the common Reader will hardly keep his countenance when he ſees the Diamond reduced to a Species of Alum; and the Emerald of Borax.

DIAMONDS.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. ORIENTAL DIAMOND.							Adamas Gemma. W.
Octahædral	hardeſt	heavieſt	brighteſt	LIVELIEST	moſt ſparkling of all gems	Eaſt Indies	
2. BASALTINE DIAMOND. BRAZIL DIAMOND.							Le Diamant de Braſil de Liſle.
Dodecahædral	very hard	heavy	bright	LIVELY	ſparkling	Braſils	

The form of the Brazil Diamond differs from the Oriental, as well as do its qualities: there are Shirly, or Baſaltine, reſemblances of all the Oriental Gems; and this is ſuch of the Diamond; and no other. De Laet was acquainted with it, and with its qualities. Agricola knew its Dodecahædral form. Wallerius accurately deſcribes its faces by their cubic ſhape. The Brazil Diamond has the ſame electric, and the ſame philoſophic properties, with the Oriental: After it has been held

held in the ſun, it has a ſilvery brightneſs in the dark; and the ſame quality, in ſome degree, when rubb'd: and it takes the foil, as the Oriental Diamond. But they all want the perfect hardneſs of the Oriental Diamond; and they have ſomewhat leſs ſpecific gravity; and they can be melted by the extream force of fire, which the Oriental Diamond cannot; it can only be torn into flat Flakes, and that way ſhews it has a ſtructure ſuch as the Zeolite, tho' like that it be obſcure.

We are not to expect all Diamonds in their perfect cryſtalized form; we ſee them rounded in the manner of the pebble Cryſtals, and like all other cryſtalized Stones, they vary in the number of the angles, even in the ſame Species.

Like all the other cryſtalline ſtones, this is alſo liable to be tinged to all colours; but theſe tinges it receives in ſo ſmall a quantity, and in a degree ſo delicate, that it is a doubt whether a coloured Diamond be not more beautiful even than a perfect clear one.

We talk of our vaſt Diamonds, the Tuſcan, the Sancy, and Pitt's; but what are theſe to that of the Mogul, which before cutting weighed very near eight hundred carats?

1. EMERALDS.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. ORIENTAL EMERALD.							Smaragdus Orientalis. W.
A column with a Pyramid *	very hard	heavy	bright, and polished	PURE GREEN	keeps its colour in the fire	Ægypt	ornament.

2. OCCIDENTAL EMERALD.							Smaragdus Occidentalis. W.
A Prism without a Pyramid	tender	heavy	glossy	PALE GREEN	loses its colour in the fire. luminous in the dark after burning	Peru	ornament.
3. BRASIL EMERALD.							Smaragdus Brasiliensis De Latt.
A Prism with two Pyramids	soft	heavy	bright, and glossy	DULL GREEN	loses its colour in the fire	the Brazils, the Grenades	ornament.

2. SAPPHIRES.

1. ORIENTAL SAPPHIRE †.							Sapphirus Mas. W.
A Rhomb of unequal sides	very hard	heavy	glossy	FINE BLUE	keeps its colour in the fire	Pegou, Conanor, Ceylon	ornament.

* This is the perfect form; but we have said, how often it is altered, or defective, or rubb'd away, 'tis so in all; but the true form should always be known.

† The Sapphire has been supposed the same Stone with the Diamond, but 'tis not so: we have blue Diamonds, which are not Sapphires; and colourless Sapphires, which yet are not Diamonds; but they are very near it: one passed thro' many Jewellers hands as such some years ago.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
2. OCCIDENTAL SAPPHIRE.							Sapphirus Fœmina. W.
A furrow'd Prism with an obtuse Pyramid	tender	heavy	bright, but uneven	PALE BLUE	keeps its colour	Peru	ornament.
3. GRASS SAPPHIRE.							Sapphirus Subviridis. W.
An octangular Prism with a Pyramid	soft	heavy	wavy	BLUE, WITH A TINGE OF GRASS GREEN	loses its colour in the fire	Bohemia	ornament.
3. RUBIES.							
1. ORIENTAL RUBY.							Rubinus Orientalis. W.
Octohædral of trigonal Planes	extreamly hard	heavy	bright, and polished	PURE, PERFECT RED	keeps its colour in the fire	Pegou	ornament.

2. BRASIL RUBY.								
A Prifm of unequal fides, with a triangular Pyramid	hard	heavy	ftreaky	PALE RED	keeps its colour in fire	the Brazils	ornament.	Rubinus Incarnatus. W.
3. SPINELL RUBY.								
A Prifm with an irregular Pyramid	tender	heavy	fcaly, but bright	ROSE-COLOUR	lofes its colour in the fire	Peru	ornament.	Rubinus Subalbus. W.
4. TAWNY RUBY.								
A fhort Prifm with a long Pyramid	tender	heavy	uneven, and ftreaky	BROWNISH RED	lofes its colour in the fire	Silefia	ornament.	Rubinus Rubacellus. W.

4. TOPAZES.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. ORIENTAL TOPAZ.							Topazius. W.
Two quadrangular Pyramids, base to base	extreamly hard	heavy	bright, glossy	JONQUILLE YELLOW	keeps its colour in the fire	East Indies	ornament.
2. BRASIL TOPAZ.							Topazius Aureus Cronstedt.
A Prism of four sides, with two Pyramids	hard	heavy	polish'd	GOLD YELLOW	loses its colour in the fire	Brazils	ornament.
3. ORANGE TOPAZ.							
A Prism with one Pyramid	tender	heavy	glossy	RUDDY YELLOW	loses its colour in the fire	Germany	ornament.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
4. SAXON TOPAZ.							Topazius Saxonicus Cronstedt.
An octahædral Prism, with two Pyramids	hard	heavy	rugged	PALE BROWN, PALE YELLOW, OR COLOURLESS	bright	Schnekenstein, in Saxony	ornament.
5. CHRYSOLITES.							
1. ORIENTAL CHRYSOLITE.							Chrysolithus Prasoides. W.
A Prism of six sides, with two Pyramids of four sides	very hard	heavy	polished	YELLOWISH GREEN	keeps its colour in the fire	Cananor	ornament.
2. OCCIDENTAL CHRYSOLITE.							Chrysolithus Crysopratus. W.
A Prism of five sides, with no Pyramid	tender	heavy	bright	PALE GREEN, WITH A YELLOW TINGE	loses its colour in the fire	Brazils	ornament.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. GOLD CRYSOLITE.							Chrysolithus Prasius. W.
A Prism with one Pyramid	hard	heavy	streaky	GOOD GREEN, WITH A CAST OF GOLD YELLOW	keeps its yellow in the fire	Peru	ornament.
5. HYACINTHS.							
1. ORIENTAL HYACINTH.							Lyncurius Veterum. H.
A long Prism of four sides, with two Pyramids	very hard	heavy	striated	FLAME-COLOUR	keeps its colour in the fire	East Indies	ornament.
2. BOHEMIAN HYACINTH.							Hyacinth Chrysoprase de Lisle.
A short Prism of four sides, with one Pyramid	hard	heavy	smooth, and glossy	YELLOWISH RED, WITH A TINGE OF GREEN	keeps its colour in the fire	Bohemia, Poland	ornament.

3. JARGON HYACINTH. *								Jargon d'Hyacinthe De Lisle.
A long Prism, with one Pyramid	very hard	heavy	polished	PALE YELLOWISH RED	keeps its colour in the fire	France		ornament.

6. GARNETS.

1. ORIENTAL GARNET.								Grenate Rouge De Lisle.
A short hexhædral Prism with two Pyramids	hard	very heavy	ridged	BLOOD RED, FIRE-COLOUR'D TO THE LIGHT	keeps its colour in the fire	Pegou		ornament.
2. SORANE GARNET.								Grenate de Surian De Lisle.
A short Prism, with one Pyramid	very hard	very heavy	glossy	DEEP ORANGE SCARLET	keeps its colour in the fire	East Indies		ornament.

* This Stone is sometimes colourless, and has been call'd, a Soft Diamond; a term that needs no comment.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. JACYNTH GARNET.							
A long Prism, with two Pyramids	very hard	heavy	bright	CRIMSON, WITH A YELLOW TINGE	keeps its colour in the fire	Coromandel	Giacinto Guarnacciuo De Lisle. ornament.
4. VIOLET GARNET.							
A short Prism, with one Pyramid	hard	heavy	polish'd	DEEP RED, WITH A PURPLE TINGE	keeps colour in the fire	Pegou	Rubino della Rocca De Lisle. ornament.
5. DEEP GARNET.							
Rounded and Polygonal	tender	very heavy	glossy	BLOOD RED	keeps its colour in the fire	Bohemia, in rocks	Grenat de Boheme De Lisle. ornament.
6. SPANISH GARNET.							
Globular, with many rhomboidal faces	tender	heavy	streaky	LIGHT RED	loses its colour in the fire	Spain, in slate	Grenat d'Espagne De Lisle. ornament.

8. BLACK GARNET.							
A ſhort Priſm, with two long Pyramids	very hard	very heavy	perfectly poliſhed	ABSOLUTE BLACK	whitens in fire	Lapland	Granatus Niger Cronſtedt. a poor iron ore.
8. GREEN GARNET.							
Rounded, and multangular *	hard	very heavy	gloſſy	PALE GREEN	whitens in fire	Saxony	Granatus Viresſcens Cronſtedt. ornament.
9. TOURMALINE GARNET.							
A Priſm of nine ſides, with two trihædral Pyramids	hard	heavy	ſmooth	PURPLE	electrical when heated	Ceylon	Lapis Electricus Act. Ber. curioſity.

* Nothing is more irregular than the cryſtalized form of the Garnets. Wallerius has aſſumed theſe variations as characters, that could be conſidered as permanent; and De Liſle counts in the ſame manner upon the inequality of their faces. I have examined a multitude, and find the ſame Stone varies in the number, and proportional breadth of the faces. What ſeemed moſt permanent in each, I have deſcribed, but owning ſtill the uncertainty: he who would name Garnets from theſe differences, might make a thouſand, but often a hundred of thoſe would be the various cryſtalizations of the ſame Stone. What the Antients knew of them, and by what names they called them, may be ſeen in an edition of Theophraſtus, which I publiſhed ſome time ſince; or more conciſely in Mr. De Liſle, who has done me the honour to perpetuate that, and my name in his immortal work.

CLASS VI.

SHIRL.

BASALTES.

An impure cryſtalized Foſſil, hard and heavy; in form of polygonal Priſms, with trigonal heads.

'TIS neceſſary this ſhould follow the Garnets; for 'tis ally'd to them moſt nearly in form, and qualities; the number of faces in the Priſm is various, and the Head is often wanting, but the Body is always to be known: and tho' but lately underſtood, is worthy great attention.

Its conſtituent parts are variouſly put together, but in themſelves they are always the ſame: thus we ſee fibrous, flaky, and glaſſy ſhirls: the ſtructure of the Talcs, the Cryſtals, and the Spars, are ſeen in their fragments; but ſtill the conſtituent ſubſtance is the ſame. No wonder thoſe who looked but little farther than the ſurface, were perplexed with this; but to a deeper ſearch all becomes plain.

Linnæus refer'd the Shirls to Alum, for their form; De Boet conſidered them as Cryſtals: the late excellent

cellent Cronſtedt ſeems to have underſtood them well: he firſt diſcovered their cloſe reſemblance to the Garnets; and (diſcovering alſo the perfect uncertainty and vague determination of the ſides and faces in the Garnets) connected both together for their matter; and neglected (with great reaſon in his work) their form.

When pure, the Shirls ſtrike fire with ſteel; but ſome are ſo debaſed with earthy mixtures, that they do it poorly. None of them ferment at all with acids; they all become electrical when heated: their number of faces varies in the ſame maſs, one Priſm being made to ſuit two others: as to ſize, we ſee them from that of Barley-Corn up to the Giant's cauſe-way.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. STOLPEN SHIRL.								
A ſimple Polygonal column, with a trihædral head	very hard	very heavy	ſmooth	RAVEN GREY	ten foot long	Miſnia	curioſity.	Baſaltes de Stolpen. W.
2. IRISH SHIRL. GIANT'S CAUSEWAY.								
Jointed columns	hard	heavy	ſmooth	PERFECTLY BLACK	immenſe, of various faces, but alike in all the joints of each column.	Antrim	curioſity.	Baſaltes Hibernicus Pl. Tran.
3. SPANISH SHIRL. CROSS STONE.								
A black and white croſs	hard	heavy	gloſſy	BLACK, AND PURE WHITE	ſmall, with the figure of a croſs	Andaluſia	amulet.	Lapis Crucis. W.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
4. FLINTY SHIRL.							Borax Lapideus Triquetrus. L.
An oblong black Prism, with two Pyramids	very hard	heavy	polished	BLACK	glassy, when broke	Germany	
5. RUDDY SHIRL.							Basaltes Rufus Cronstedt.
An oblong, ruddy Prism, with one Pyramid	hard	very heavy	smooth	RUDDY BROWN	granulated	Nerike, in Sweden	
6. GREEN SHIRL.							Basaltes Virens Cronstedt.
A short, green Prism, with one Pyramid	tender	heavy	glossy	PALE GREEN	cloudy within	Sweden	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
7. MULTANGULAR SHIRL.							
A Prism of many sides, with two Pyramids	hard	heavy	polished	DEEP GREEN	foul within	Germany	Schorl Verde Davila.
8. WHITISH SHIRL.							
White, long, angulated needles	tender	light	glossy	WHITISH, WITH A TINGE OF BROWN, OR BLACK	clustery	Bristol	Schorl d'Aiguille Davile.
9. VESUVIAN SHIRL.							
A hexædral flatted Prism, with two Pyramids	hard	heavy	even	YELLOWISH, OR BLACKISH	clustery	Mount Vesuvius	Basalte de Vesuvius De Lisle.

10. EMERALD SHIRL. MOTHER OF EMERALDS *.							Balſaltes Spatoſus Cronſtedt.
A Polygonal Priſm, with one Pyramid	tender	heavy	poliſhed	FINE GREEN	cloudy within	Ægypt	ornaments.
11. STRIATED SHIRL.							Baſaltes Fibroſus Cronſtedt.
A truncated Priſm of many ſides	hard	very heavy	gloſſy	WHITISH, WITH STAINS OF RUDDY BROWN, BLACK, OR GREEN	of a ſtriated texture	Sweden	
12. STARRY SHIRL.							Baſaltes Concentratus Cronſtedt. Aſbeſt Fauſſe. W.
Thick maſſes of many angles	tender	very heavy	uneven	browniſh, clouded with black and green	radiated, as a ſtar	Sweden	

* Mr. Dacoſta errs, in ſuppoſing this not to be the Mother of Emerald: Cronſtedt is a great authority; but the truth is confirmed by a much greater, that of our ſenſes. I wiſh this ingenious and knowing mineraliſt had ſpared the unkind note on his great author.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
13. DEBAS'D SHIRL.							Baldolites Saxius Cronstedt.
Vast rude masses	hard	very heavy	irregular	BROWN, WITH GREY, RUDDY, OR BLACK SPOTS	stony	Sweden	

CRYSTALS.

ORDER VIII.

ZEOLITES.

Pure Fossils in columnar forms, hard, heavy, bright, and flaky.

These resemble the Shirl in all things; but that, when viewed with good glasses, their texture is flaky. They are harder than Spars, but less hard than pure Crystal; they do not effervesce with acids, but they are soluble in that of Nitre; and the solution becomes a hard jelly.

They melt freely in the fire, and yield a light like the flame of electricity just in the moment of their fusion.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. JONQUILLE ZEOLITE.							
Convergent Pyramids	hard	heavy	perfectly polished	JONQUILLE YELLOW	cluster'd, in small flakes	Sweden	Zeolithus Crystalizatus Cronstedt.
2. PURE ZEOLITE.							
A truncated Prism	hard	heavy	glossy	COLOURLESS	single, with fine flakes	Sweden	Zeolithus Distinctus Cronstedt.
3. HYACINTHE ZEOLITE.							
Small masses	tender	very heavy	glossy	FLAME-COLOUR'D	shattery	Sweden	Zeolithus Spatolus Cronstedt.
4. BLUE ZEOLITE.							
Rude masses	hard	very heavy	uneven	BLUE, WITH YELLOW AND WHITE SPOTS	breaks like flint	Persia	Zeolithus Cærulens Cronstedt.
5. WHITE ZEOLITE.							
Large masses	very hard	heavy	rugged	YELLOWISH WHITE	flinty	Denmark	Zeolithus Durus Albus Cronstedt.

NATIVE FOSSILS.

CLASS VII.

ASBESTINE FOSSILS.

ASBESTIÆ.

Pure Fossils, composed of strait, parallel threads, flexible, but not elastic.

THE Asbestes bear the fire; and webs wrought of them may be cleaned by burning: but this is never done without a degree of injury; for on the most careful trials, I have always found Native Asbeste of the same kind more flexible than what has been burnt: there is a leathery toughness in most of the pure sorts, when kept as they were taken out of the earth; but it is lost by burning.

'Tis said, the Asbesti are formed of Talc, resolving itself into Clay: it must then have been striated in the plated state: but 'tis not so. Few people have glasses of more power than mine, and I have examined the purest Talc, but never seen this. If these authors would infer it from some debased talcy substances, which are striated, they want that precision, without which little is to be determined in this study. Besides, this change would infer, that the alteration of form ren-

renders the ſame body different in the fire; the laſt and greateſt of all teſts of Foſſils.

Talc is unalterable in the fire; Aſbeſte is hardened in it; and Clay runs to Glaſs: therefore, according to this plan, one body, Talc, can afford three different conditions in the fire; as it happens without mixture, for that is not ſuppoſed, only that it has changed its form. I reverence Linnæus, yet do not receive his aſſertion, Mica concretio Argillæ, as abſolute and certain: nor will himſelf, when he has but given it this conſideration: nor yet the general character, Amianthus lapis ex Argilla; till we have found Mica Amianthus and Argilla, ſuffer the fire alike. Nor will the opinion of Cronſtedt overrule the doubt, for 'tis but an opinion; and I ſhould have expected, and have wiſhed, to have found it rather in any other author.

The Aſbeſtes are the ſofteſt, and the lighteſt of all minerals; they have no determinate manner of breaking; they always lie in the beds with horizontal fibres; never perpendicular, and ſeldom much inclin'd; they are ſo tough you twiſt them like hemp; ſo light they ſwim on water: too ſoft for ſtriking fire; and too fixed for all the power of acids. Some reſemble animal, as others vegetable ſubſtances; and hemp and leather equally are imitated by them: ſome maſſes look like Foſſil wood; and ſome like efflorescences of Salts, but they ſoon diſcloſe their nature, on handling; ſeparating eaſily into threads, and having nothing of a ſaline quality.

ASBESTINE

ASBESTINE FOSSILS.

ORDER I.

ASBESTE.

ASBESTUS.

Compoſed of ſtrait, even, parallel, long threads.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. PURE ASBESTE*.							Amiantus Aſbeſtus L.
Long, entire threads	tender	very light	gloſſy	GREY	moſt flexible	Siberia, Cyprus	wicks of lamps

* This is ſpun into purſes, and made into paper; but there is more in the name than the uſe.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
2. CLASSY ASBESTE.							
Bright, ſhort threads	hard	heavy	poliſhed	OLIVE-COLOUR'D	brittle	Sweden, Angleſea	Amiantus Fragilis. L. curioſity.
3. WOODY ASBESTE.							
× Maſſes like foſſil wood	hard	heavy	ſtreaky	PALE BROWN	ſcarce ſeparable into threads	Italy	Amiantus Immaturus. L. curioſity.
4. EARTHY ASBESTE.							
Flat, coarſe plates	tender	heavy	clay-like, but ſtriated	PALE GREY	breaks in parting	Germany	Amiantus Terreſtris. L. curioſity.
5. RADIATED ASBESTE.							
In ſtarry cluſters	hard	heavy	gloſſy	OLIVE-COLOUR'D	moſs-like	Sweden	Amiantus Radians. L.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
6. GREEN ASBESTE.							
Flat maſſes	tender	heavy	uneven	DIRTY GREEN	not to be ſeparated into threads	Germany	Aſbeſte non Mur Verdatre. W.
7. BLACK ASBESTE.							
Small maſſes	hard	heavy	gloſſy	DEEP BLACK	ſcarce ſeparable	Crete	Aſbeſte non Mur Neratre. W.
8. CRYSTALLINE ASBESTE.							
Thin plates	hard	heavy	poliſh'd	COLOUR-LESS	not ſeparable	Germany	Aſbeſte non Mur Tranſparente. W.
9. BRUSH ASBESTE.							
Small tufts	tender	heavy	rugged	GREYISH	firm	Sweden	Aſbeſte en Bouquets. W.

ASBESTINE FOSSILS.

ORDER II.

AMIANTH.

AMIANTUS.

Compoſed of ſlender, cluſter'd fibres, intricately mixed.

THESE partake ſo much of the Aſbeſtine nature, that they always lie lengthwiſe, not perpendicularly in their beds: and they ſplit lengthwiſe only, tho' it be leſs regularly than the Aſbeſtes. The Amianths will not ſpin into cloths, but paper may be made of ſome of them, and 'tis curious to ſee the writing burnt out, and the paper clean for freſh uſe: but the uſe is little.

Reiger has taken great pains to prove it a vegetable ſubſtance, not mineral; but his numerous reaſons might have been all obviated, if he had thought of putting a bit of it into the fire.

It is ſingular, that a ſubſtance very much reſembling the Amianths, may be made by art, with Arſenic, and the Vitriolic Acid.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. PLUME AMIANTH. PLUME ALUM.							Amiantus Plumosus.
Oblong maſſes	ſoft	very light	woolly	PALE GREY	ſwims in water	Denmark	irritation in palſies
2. CHAFF AMIANTH.							Lapis Aceroſus Rafilis. W.
Rough lumps	brittle	light	prickly	RUDDY GREY	ſinks in water	Sweden	
3. HARD AMIANTH.							Lapis Aceroſus Rigidus. W.
Small cluſters	hard	heavy	covered with points	GREY	ſinks in water	Germany	

4. PERPLEX'D AMIANTH.								Amiantus Implexus. L.
Small maſſes	tender	heavy	unevenly ſtreak'd	WHITISH	ſwims in water	Sweden		
5. RUDDY AMIANTH.								Byſſus Martialis Cronſtedt.
Rude lumps	hard	heavy	irregular	REDDISH	ſinks in water	Germany		
6. GREEN AMIANTH.								Byſſus Virescens Cronſtedt.
Large, flatted maſſes	tender	heavy	wav'd	DULL GREEN	ſinks in water	Sweden	a copper ore.	

ASBESTINE FOSSILS.

ORDER III.

CARYSTINES.

CARYSTIA.

Compoſed of flaky plates, formed of inſeparable, tough fibres.

THESE are in their original, fibrous, as well as the preceding kinds; but the fibres are formed into ſmall flat flakes; and theſe flakes again into larger maſſes of the ſame form and kind. Theſe are tough, flexible, and light; and to a ſtranger would appear rather of animal, or vegetable, than of Foſſil origin. But the place where they are found, their ſtructure when examined with glaſſes, and their reſiſting the force of fire, ſhew clearly what they are.

1. LEATHER

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. LEATHER CARYSTINE.								
Flat membranes in cracks of rocks	ſoft	very light	like flannel	YELLOWISH GREY	ſwims on water	Sweden		Amiantus Aluta. L.
2. FLESHY CARYSTINE.								
Thick, flat cakes	ſoft	light	undulated	WHITISH	ſwims on water, very flexible	Germany		Amiantus Caro Montana. L.
3. CORK CARYSTINE.								
Broad maſſes	ſoft	light	uneven	RUDDY BROWN	ſoaks in the water, and then ſinks	Saxony		Amiantus Suber L.
4. YELLOW CARYSTINE.								
Great flakes	tender	heavy	wav'd	OCHREOUS YELLOW	ſinks in water	Sweden		Caro Montana Flavicans Cronſtedt.

NATIVE FOSSILS.

CLASS VIII.

EARTHS.

TERRÆ.

Foſſils compoſed of imperceptible particles, united into firm, but not hard maſſes.

THE Earths are a numerous tribe; but they have been ſuppoſed more numerous than they are: Sands have been counted among them, which are not of their nature, nor anſwer to their common character.

They are very important in their uſes to mankind; and therefore worthy a place in all cabinets; tho' they add little to their beauty.

There are five principal kinds of Earths:

1. CLAYS,	4. MOULDS,
2. CHALKS,	5. BOLES,
3. MARLES,	6. OCHRES.

Theſe ſerve for purpoſes perfectly various; and are in their nature evidently diſtinct; and eaſily diſtinguiſhable by their characters.

Two are primitive Foſſils, Chalk, and Clay; Mould is perfectly adventitious, and variouſly mixed; Marles have animal remains; and Boles and Ochres have always a metallic mixture: the Alkaline Earths (here called Chalks, for the ſake of a ſhorter name) have been ſuppoſed of animal origin; and they are now received as ſuch; but the matter does not appear thus to me. I muſt be indulged in the uſe of my own experience; but the reaſons of my doubts will be ſeen, and may be judged by all.

Earths are tender, tho' compact; they may be rubb'd to pieces in the hands, tho' ſome more difficultly than others: they diſunite in water, but do not diſſolve in it.

EARTHS.

ORDER I.

CLAYS.

ARGILLÆ.

Tough, ductile, heavy, ſmooth maſſes.

THE diſtinctions of Foſſils are all relative: but they become abſolute when viewed in compariſon with the other bodies of the ſame kind: ſo theſe four words comprehend a character of Clay, by which it will be diſtinguiſhed at ſight from all other kinds of Earths.

This Diſtinction of an Earth from other Earths is all that ſhould be attempted in the character of an Order.

The difference of Earths from other Foſſils is given in the character of the Claſs.

Linnæus deſcribes Clay as a precipitation of a tough Sea-water. 'Tis well we need not enquire minutely into this; for it would not bear ſuch enquiry.

Wallerius tells us, Clays are form'd of cubic particles. This we ought to enquire into; and I am ſorry to ſay, we do not find it ſo. I wiſh it were; 'twould be a great natural diſtinction.

If we would lay down the Earths as Cronſtedt, we muſt take in the Spars, the Cryſtals, Talcs, and even the Gems. Yet this was right in him, whoſe work was deſtin'd to the uſe of miners. Let me not ſeem to blame authors, where I decline adopting their opinions. Theſe deſerve reſpect, nay, reverence, all of them; but men are not infallible: and if one work were perfect, we need not labour after more.

All Clays look dull when broken; all ſoften and become unctuous in water; and all harden in the fire.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE CLAY.							Argilla Apyra. L.
Vast strata, deep	very tough	very heavy	very ductile	PURE WHITE	unctuous	Isle of Wight	tobacco pipes.
2. GREY CLAY.							Argilla Leucargilla. L.
Vast strata	tough	heavy	ductile	GREYISH	fatty	Germany	tobacco pipes.
3. PURPLE CLAY.							Argilla Vulcan. L.
Thin strata	very tough	heavy	very ductile	PALE VIOLET-COLOUR	unctuous	France	furnaces.
4. BLACK CLAY.							Argilla Nigra. L.
Deep, thick strata	tough	very heavy	less ductile	BLACK	grows white in the fire	Montmartre	tobacco pipes.

5. BLUE CLAY.								Argilla Communis. L.
Vaſt ſtrata	very tough	heavy	very ductile	LEAD COLOUR	reddens in the fire	Leiceſter-ſhire	tiles.	
6. POT CLAY.								Argilla Figulina. L.
Vaſt ſtrata	tough	heavy	ductile	GREY	reddens in the fire	Warwick-ſhire	pots and pans.	
7. PORCELANE CLAY.								Argilla Porcellana. L.
Vaſt ſtrata	brittle	heavy	not very ductile	WHITE, WITH SPANGLES	dry	China	porcelane.	
8. YELLOW CLAY.								Argilla Chinenſis.
Vaſt ſtrata	brittle	very heavy	ductile when wet	YELLOW, WITH SPANGLES	dry	China	coarſe porcelane.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
9. LEMON CLAY.								Argilla Lithomarga. W.
Vaſt ſtrata	tough	heavy	very ductile	VERY PALE YELLOW	unctuous	Tartary	great pipe heads.	
10. DUSKY CLAY.								Argilla Sterilis. L.
Vaſt ſtrata	tough	heavy	very ductile	BROWNISH YELLOW	fatty, but coarſe	England	bricks.	
11. RED CLAY.								Argilla Incarnata. L.
Thin ſtrata	brittle	heavy	ductile	PALE RED	dry	Sweden		
12. GREEN CLAY.								Argilla Talcoſa. L.
Thin ſtrata	crumbly	light	not very ductile	COARSE GREEN, WITH SPANGLES	duſty	Ægypt, Germany		

13. TAWNY CLAY.								Argilla Tumescens. L.
Vast strata	spungy	heavy	not very ductile	REDDISH YELLOW	sandy	Wiltshire	poor pottery.	
14. DARK CLAY.								Argilla Grandæua. L.
Vast strata	hard	heavy	crumbly	DEEP BROWN	full of small gravel	Worcestershire	for ovens.	
15. STAINING CLAY. UMBER.								Argilla Umbra. L.
Great masses	brittle	light	crumbly	DUSKY BROWN	stains the fingers	Italy	for painting.	
16. ÆGYPTIAN CLAY.								Argilla Nilotica. L.
Vast cakes	brittle	heavy	crumbly	LIGHT BROWN	dusty	Ægypt	a manure.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
17. UNDERBOG CLAY.							Argilla Vitriolica. L.
Thick ſtrata	tough	heavy	ductile	BLACKISH	ſtyptic	Ireland	

I have taken the Linnæan trivial names for Clays; for no author has underſtood their characters ſo clearly and diſtinctly: but the liſt is ſmaller here; for his 6th, 8th, and 14th, are Boles; his 7th, 17th, and 20th, Marles. Theſe will be found in their places; but excepting for this mixture, which my ſpecimens, and my experiments diſclaim, his diſtinctions are excellent: and 'tis the purpoſe here to give, that author's names, who appears to have underſtood the particular body beſt; to uſe not one, but all; and give a ſhort direction where 'tis beſt to ſeek farther accounts, than the nature of this work admits.

E A R T H S.

O R D E R II.

C H A L K S.

C R E T Æ.

Dry, duſty, light, brittle, ſtaining maſſes.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. PURE CHALK.							
Vaſt ſtrata	hard	heavy	compact	WHITE	hardeſt, as deepeſt	England	for lime. Calx Creta. L.
2. DUSTY CHALK.							
Vaſt maſſes	crumbly	heavy	brittle	WHITE	foul with ſtones	Sweden	a manure. Calx Marmorea. L.
3. YELLOW CHALK.							
In great maſſes	brittle	heavy	duſty	YELLOWISH	foul with ſtones	Sweden	a manure. Calx Marmorea Flava. L.
4. RUDDY CHALK.							
Vaſt lumps	hard	very heavy	brittle	REDDISH	ſandy	Foreſt of Dean	lime. Calx Marmorea Rubra. L.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. AGARICK CHALK.							Calx Paluſtris. L.
Flat, great cakes	ſoft	light	friable	PURE WHITE	ſtainy	Sweden	white waſhing.
6. MOON CHALK. LACLUNÆ.							Calx Guhr. L.
Great lumps, deep in rocks	very ſoft	very light	very brittle	PURE WHITE	ſtainy	Germany	an abſorbent.
7. RED CHALK.							Creta Rubens. W.
Large, rude maſſes	hard	very heavy	brittle	FINE RED	ſtains	Germany	for painting.

EARTHS.

ORDER III.

MARLES.

Tender, crumbly, light, coarſe maſſes.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. WHITE MARLE.								
Vaſt ſtrata	ſoft	light	very crumbly	PURE WHITE	breaks ſwiftly in water	England	manure.	Argilla Marga. L.
2. SALINE MARLE.								
Vaſt looſe ſtrata	brittle	heavy	crumbly	BROWN	ſalt taſte	Palæſtine		Argilla Muriatica. L.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
3. CHINA MARLE.								
Vast masses	compact	heavy	coarse, and uneven	LIGHT GREY	full of spangles	China	porcelane.	Terre à Porcelane, W.
4. CHALKY MARLE.								
Vast strata	firm	heavy	uneven	YELLOWISH WHITE	cleansing for woollen	Greece	for the fullers.	Marne Cretacee, W.
5. FULLER'S MARLE. FULLER'S EARTH.								
Vast masses	soft	heavy	irregular	OLIVE-BROWN	most unctuous	England	for clothiers.	Argilla Fullonica, L.
6. WHITE FULLER'S EARTH.								
Thick strata	hard	heavy	glossy	GREYISH WHITE	soft	Germany	for cloaths.	Smectis Grisea, W.

7. RED MARLE.								Marna Rougo. W.
Deep ſtrata	hard	light	rugged	RED	breaks eaſily in water	England	manure.	
8. BROWN MARLE.								Marga Fuſca. W.
Vaſt ſtrata	tender	light	uneven	BROWN, MIXED WITH GREY AND YELLOW	breaks freely	England	manure.	
9. DOVE MARLE.								Marga Columbina. W.
Vaſt ſtrata	hard	heavy	rough	DOVE COLOUR, WITH RED AND BROWN SPOTS	breaks freely	England	manure.	
10. YELLOW MARLE.								Marga Flava. W.
Deep ſtrata	tender	light	duſty	DEAD YELLOW	breaks freely	England	manure.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
11. BLUE MARLE*.								Marga Cærulea. W.
Vaſt ſtrata	hard	heavy	ſhattery	DEAD BLUE, SIMPLE, OR VEIN'D	breaks ſlowly	England	manure.	
12. BLACK MARLE.								Marga Nigricans. W.
Great maſſes	tender	heavy	crumbly	BLACK	breaks freely	England	manure.	
13. STEEL MARLE.								Marga Ferrea.
Great lumps	hard	light	ſhattery	DEEP GREYISH	breaks in dice	England	manure.	
14. PAPER MARLE.								Marga Papyracea.
Thin flakes	ſoft	light	fiſſile	PALE GREY	ſplits into leaves	England	manure.	

15. SCALY MARLE.								Marga Teſtacea. L.
Deep ſtrata	ſoft	light	brittle	WHITE	ſplits	Holland	manure.	
16. SHELL MARLE.								Marga Conchacea. L.
Thick ſtrata	tender	light	very brittle	WHITISH	crumbly	England	manure.	
17. SAND MARLE.								Marga Lapidifica. W.
Vaſt ſtrata	hard	heavy	ſtony	PALE BROWN	firm	England	manure.	
18. CLUSTER MARLE.								Marga Tophacea. W.
Vaſt lumps	tender	light	rugged	DEEP BROWN	crumbly	Holland	manure.	

* There is evidently, Clay in this Marle; and Cronſtedt has great reaſon on his ſide, when he calls Marle a mixture of calcarious and clayey Earth.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
19. DENDRITE MARLE.							Marga Dendrites. W.
Thin ſtrata	hard	heavy	uneven	PALE GREY	mark'd with figures of moſſes	Germany	manure.
20. SHELL MARLE *.							Marga Immatura.
Vaſt ſtrata	tender	light	rugged	BROWN, AND WHITE	full of ſhells	Woolwich	manure.

* Many of the Marles have frequently Shells in them; but this is almoſt compoſed of them. 'Tis a doctrine, that all Marles are formed of decayed Shells; and this is, by thoſe authors, ſuppoſed yet imperfect, or unripe: but there are Marles that have nothing ſhelly in them.

EARTHS.

ORDER IV.

MOULDS.

Impure, crumbly, light, mixt Earths.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. PURE MOULD.							Humus Dedalæa. L.
A loose dust	tender	very light	smooth	PALE BROWN	impalpable	every where	the food of vegetables.
2. DUSKY MOULD.							Humus Rurali. L.
A coarse dust	soft	light	uneven	DEEP BROWN	granulated	every where	the bed of plants.
3. LAKE MOULD.							Humus Lacustris Lutum. Cronstedt. L.
Deep beds	very soft	heavy	smooth	BLACKISH	impalpable	under water	rich manure.
4. RED MOULD.							Terra Adamica. W. Humus Damascena. L.
Thick strata	tender	heavy	rugged	DUSKY RED	crumbly	Northamptonshire	rich land.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.	
5. HEATH MOULD.								
Deep beds	hard	light	uneven	DEAD BROWN	barren	on heaths	none.	Humus Pauperata. L.
6. LOOSE MOULD.								
ſuperficial beds	tender	light	uneven	BLACKISH	ſwelling with wet	in gardens	throws up roots	Humus Effervescens. L.
7. DINGY MOULD.								
Deep beds	tender	light	ſmooth	UMBER-COLOUR'D	wet	on mountains	bed of Alpine plants	Humus Alpina. L.
8. TURF MOULD.								
Deep beds	tender	light	rugged	RUDDY BROWN	mixt with roots and bitumen	in bogs	for firing.	Humus Turfa. L.

9. IRON MOULD.							Humus Tinctoria.
Thick beds	tender	heavy	ſmooth	INKY	vitriolic	Sweden	for dying black.
10. BLACK MOULD.							Humus Picea. L.
Superficial ſtrata	tender	heavy	rugged	DEEP BLACK	hardens in air	England	a rich land.
11. SLATE MOULD.							Humus Schiſtoſa. L.
Superficial ſtrata	hard	heavy	plated	RUDDY BROWN	fiſſile	England	an alum ore.
12. STAINING MOULD.							Humus Nigrica. L.
Great lumps	ſoft	light	crumbly	BLACK	ſtains like chalk	Sweden	for colouring.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
13. RAVEN EARTH.							
Great masses	hard	heavy	uneven	RAVEN GREY	crumbly	Sweden	Humus Lenticularis. L.
14. ANIMAL EARTH.							
Dust	soft	light	even	BROWN	tender	church-yard	Humus Animalis. L.

EARTHS.

ORDER V.

BOLES.

Smooth, soft, heavy, unctuous, tender masses.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE BOLE ARMENIC.							Argilla Bolus. L. Bolus Alb. H.
Thick lumps	firm	very heavy	polished	PURE WHITE	melts in the mouth	Armenia	a medicine for fluxes.
2. BRITTLE WHITE BOLE.							Bolus Friabilis. H.
Thin strata		heavy	dusty	WHITE	unctuous	Germany	a medicine for poison.
3. GREY BOLE.							Bolus Eretria. H. Bol Gris. W.
Vast masses	hard	heavy	smooth	GREYISH WHITE	crumbly	Greece	a medicine.
4. YELLOW BOLE ARMENIC.							Bolus Armena Galeni. H.
Thick strata	tender	heavy	polished	PALE YELLOW	melts in the mouth	Greece	a medicine for fevers.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. BOLE OF BLOIS.							Bolus Blesensis. H.
Thick masses	soft	light	dusty	GOOD YELLOW	melts in the mouth	Blois and Tokay	an astringent.
6. YELLOW LEMNIAN EARTH.							Terra Lemnia Flava. H.
Thick cakes	very hard	heavy	dusty	FULL YELLOW	breaks in flakes	Greece	an astringent.
7. ORANGE BOLE.							Terra Sigillata Livonica Lutea. H.
Thick cakes	tender	light	smooth	REDDISH YELLOW	melts in the mouth	Livonia	for fevers.
8. RED BOLE ARMENIC.							Bolus Rubra Durissima. H.
Deep strata	very hard	heavy	dusty	DEEP YELLOWISH RED	sticks to the tongue	Armenia	for fluxes.

9. RED FRENCH BOLE.								Bolus Rubra Gallica. H. *
Thick ſtrata	tender	very heavy	rough	PALE RED, WITH YELLOW VEINS	gritty	near Paris	for fluxes.	
10. STRIGA EARTH.								Terra Sigillata Strigonienſis. H.
Thick ſtrata	tender	light	duſty	DULL RED	brittle	Hungary	for fevers.	
11. TUSCAN BOLE.								Terra Sigillata Rubra Magni Ducis. H.
Vaſt maſſes	friable	very heavy	irregular	PALE RED	gritty	Tuſcany	for fevers.	
12. RED LEMNIAN EARTH.								Terra Lemnia Rubra. H.
Thick ſtrata	very hard	heavy	poliſhed	DEEP RED	melts in the mouth	Greece	for fevers.	

* Many of theſe medicinal Earths come to us, ſeal'd; and there have been thought to be more than there really are: theſe ſeem, on a careful enquiry, to be all the truly diſtinct kinds.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
13. AMERICAN BOLE.								
Vast lumps	very hard	heavy	uneven	FLESH-COLOUR'D	melts in the mouth	Virginia, and Carolina	astringent.	Bolus Rubescens. H.
14. TRIPELA.								
Thin strata	hard	light	dusty	PALE RED	harsh, and gritty	Naples	for scouring.	Argilla Tripolitana. L.
15. BROWN BOLE.								
Large cakes	firm	heavy	smooth	PALE BROWN	melts in the mouth	Gosselaer	an astringent.	Bolus Fusca. H.
16. GREEN BOLE.								
Small lumps	tender	very heavy	polished	DUSKY GREEN	melts in the mouth	Cornwall	astringent.	Bolus Virescens. H. Bolus Viridis. W.

17. BLACK BOLE.								Le Bol Noir. W.
Vast lumps	very hard	heavy	glossy	PERFECTLY BLACK	bitumi-nous	Germany	astringent.	
18. DUSKY BOLE.								Bolus Squammosa Cronstedt.
Thin cakes	hard	heavy	rough	BLACKISH	green, when powder'd	Sweden	an iron ore.	

E A R T H S.

O R D E R V.

O C H R E S.

Dry, dusty, staining, fine masses.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. DUSTY WHITE OCHRE.							Ochra Plumbi. L.
Small pieces	friable	very heavy	dusty	PURE WHITE	crumbly	Sweden	a lead ore.
2. FIRM WHITE OCHRE.							Ochra Zinci. L.
Small lumps	hard	very heavy	smooth	WHITE	stains the hands	Germany	a Zink ore.
3. YELLOW OCHRE.							Ochra Ferri. L.
Thin strata	soft	light	dusty	BRIGHT YELLOW	crumbly	England	a paint.
4. TAWNY OCHRE.							Ochra Cobalti. L.
Great masses	tender	very heavy	uneven	TAWNY YELLOW	brittle	Sweden	a paint.

5. GOLD OCHRE.								Ochra Theophrasti. H.
Thin masses	tender	light	rugged	BRIGHT YELLOW	crumbly	England	a paint.	
6. SAFFRON OCHRE.								Ochra Attica. H.
Flat cakes	brittle	light	uneven	SAFFRON YELLOW	flaky	Northamptonshire	a paint.	
7. NAPLES OCHRE.								Ochra Giallolina. H.
Large lumps	brittle	heavy	rugged	FINE YELLOW	crumbly	Italy	a paint.	
8. RED OCHRE.								Ochra Sil Syriacum H.
Vast cakes	brittle	very heavy	uneven	STRONG RED	crumbly	England	a coarse paint.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
9. PURPLE OCHRE.							Ochra Sil Atticum. H.
Great lumps	tender	very heavy	dusty	PURPLISH RED	friable	Spain	a paint.
10. CRIMSON OCHRE.							Ochra Purpurea. H.
Great cakes	hard	extreamly heavy	uneven	DEEP PURPLISH CRIMSON	gritty	Isle of Ormuz	a paint.
11. VENETIAN OCHRE.							Ochra Veneta. H.
Great cakes	tender	light	dusty	PALE RED	perfectly pure	Venice	a paint.
12. SINOPIC OCHRE.							Ochra Sinopica. H.
Thick masses	compact	very heavy	smooth	DEEP RED	soft to the touch	Greece	a paint.

13. RED CHALK OCHRE.								Ochra Creta Rubra. H.
Great maſſes	very hard	heavy	poliſhed	GOOD RED	unctuous	Italy		a paint.
14. MARBLE OCHRE.								Ochra Sil Marmoroſum. H.
Great maſſes	ſtony hard	heavy	uneven	STRONG RED	duſty	China		a paint.
15. RUSTY OCHRE.								Ochra Cupri. L.
Small cakes	tender	very heavy	rough	RUST COLOUR, BROWN, RED	green, when diſſolv'd	Sweden		a copper ore.
16. GRAIN'D RED OCHRE.								Ochra Ferrugo. L.
Small lumps	ſoft	very heavy	rugged	RUSTY RED	granulated, and thready	Sweden, in iron mines and on iron		a paint.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
17. STREAKY RED OCHRE.							
Small lumps	tender	heavy	fibrous	PALE RED	plumose	France	Ochra Stibiga. L. a paint.
18. GREEN OCHRE.							
Small masses	friable	light	granulated	GOOD GREEN	dusty	Germany	Ochra Æris. L. Ochra Chrysocolla. H. a paint.
19. CHRYSOLITE OCHRE.							
Rough lumps	brittle	heavy	uneven	YELLOWISH GREEN	green, when dissolv'd	Sweden	Ochra Nickeli. L. a paint.
20. FIBROUS GREEN OCHRE.							
Small masses	tender	light	rugged	PALE GREEN	crumbly	Virginia, on copper ore	Ochra Ærugo. L. a paint.

21. SOFT BLUE OCHRE.								Ochra Lapis Armenus. H.
Great lumps	friable	heavy	dusty	LIGHT BLUE	hisses in water	Germany	a paint.	
22. HARD BLUE OCHRE.								Ochra Cupri. L.
Small lumps	hard	heavy	polished	GOOD BLUE	earthy	Sweden	a paint.	
23. STRIATED BLUE OCHRE.								Ochra Cuprigo. L.
Great lumps	tender	very heavy	rugged	FINE BLUE	fibrose	Germany	a paint.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
24. BLACK OCHRE.								Ochra Magnesia. Ln.
Great masses	tender	light	uneven	BLACKISH	crumbly	Leicestershire	a paint.	
25. FIBROSE BLACK OCHRE.								Ochra Argentigo. Ln.
Small lumps	hard	very heavy	streaky	DEEP BLACK	thready	Saxony	a silver ore.	
26. BLACKISH TRIPELANE OCHRE.								Ochra Tripela Fusca. M.
Great masses	hard	heavy	uneven	BLACKISH, OR BROWN	dusty	Warwickshire	for polishing.	

PART II.

COMPOUND FOSSILS.

Form'd by mixture of two, or more of the Native, Earthy kinds.

CLASS I.

SEMI-PELLUCID GEMS.

Hard, heavy, rounded maſſes: rude on the ſurface, ſmooth where broken, and compoſed of imperceptible particles.

THESE do not ferment with Acids: they ſtrike fire with ſteel, and they take a delicate poliſh.

They all encreaſe in weight by calcination; in the manner of Lead, and ſome other metals. 'Twas Henkel firſt aſtoniſhed the world with this account: and by repeated trials, I have found it true, but in various degrees.

They all run in the fire, and make glaſs; to this purpoſe thoſe ſerve beſt which have leaſt colour, or come neareſt to pure Cryſtal. Cronſtedt ſays, there are kinds which make a glaſs, that is injured by Acids; and thoſe ſo weak, as what are in the Rheniſh and Moſelle wines.

COM-

COMPOUND FOSSILS.

ORDER I.

OPALS.

Uniform, almoſt pellucid, varying the ſhades of colours with the light.

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
1. PURE OPAL.							
Small lumps	hard	heavy	raiſed in lumps	PALE, AND CHANGEABLE	almoſt tranſparent	India, Ægypt	ornament. Silex Opalus. L.
2. WHITE OPAL.							
Larger lumps	ſoft	light	uneven	MILKY, AND CHANGEABLE	opake	Arabia	ornament. Opalus Albus. Cronſtedt.

3. OLIVE OPAL.								Opalus Pœderota Cronſtedt.
Small maſſes	hard	heavy	tuberous	PALE BROWN, CHANGE-ABLE	red, when ſeen thro'	Ægypt	ornament.	
4. YELLOW OPAL.								Opalus Flaveſcens. W.
Larger lumps	tender	heavy	rugged	YELLOWISH, A LITTE CHANGE-ABLE	ruddy, when ſeen thro'	Saxony	ornament.	
5. BLACK OPAL.								Opalus Niger. W.
Small maſſes	hard	heavy	gloſſy	COAL BLACK, CHANGE-ABLE, WITH YELLOW	obſcure	Eaſt Indies, Germany	ornaments.	
6. CAT'S EYE.								Silex Pſeudoopalus. L.
Rugged lumps	hard	light	raiſed in bumps	YELLOWISH, CHANGE-ABLE, WITH WHITISH	obſcure	Ceylon, Siberia	ornaments.	

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.
I. WORLD'S EYE.							Silex Oculus Mundi. L.
Small maſſes	hard	heavy	irregular	GREYISH, BROWN	tranſparent, in water	Eaſt Indies	ornament.

COMPOUND FOSSILS.

ORDER II.

ONYXES.

Plated, opake, variouſly coloured, in diſtinct beds.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. ARABIAN ONYX.							Onyx Corneus. W.
Small lumps	hard	heavy	warted	BLUEISH GREY	beds of black and white	Eaſt Indies	rings.
2. BROWN ONYX.							Onyx Circulis Fuſcis. W.
Larger lumps	hard	heavy	tabulated	GREY	beds of dead brown	Conanor	ornaments.
3. CAMÆAN ONYX.							Onyx Memphitis. W.
Small lumps	hard	heavy	tily	BLACK, AND WHITE	ſeparate thick beds	Eaſt Indies	for engraving gems.
4. SARDONYX.							La Sardonyx. W.
Small lumps	hard	heavy	undulated	RUDDY, BROWNISH	beds of white	Ægypt	for gems.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. SIBERIAN ONYX.							Onyx Carnea Cronstedt.
Small lumps	very hard	heavy	uneven	GREY	veins of flesh-colour	river Tomin, Siberia	ornaments.

COMPOUND FOSSILS.

ORDER III.

JASPONYXES.

Opake of various colours, in thick veins, blotches, or spots: not in plates.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLOUDED JASPONYX.							Jaſponyx Capnias. W.
Large lumps	hard	heavy	wav'd, and warted	PALE RED	grey, cloudy within	Arabia	boxes.
2. SPOTTED JASPONYX.							Jaſponyx Mouchette. W.
Small maſſes	tender	heavy	rugged	DULL GREEN	ſpots of pale red	Ægypt	ſnuff boxes.

COMPOUND FOSSILS.

ORDER IV.

CHALCEDONY.

Duſky, clouded, and mixed of various colours.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. GREENISH CHALCEDONY.							Silex Chalcedonius. L.
Little lumps	very hard	heavy	coated	GREYISH GREEN	uneven veins	Ægypt	snuff boxes.
2. BROWN CHALCEDONY.							Chalcedonius Griseo Spadiceus. W.
Large lumps	hard	heavy	wav'd	BROWNISH GREY	clouded	Ægypt	ornament.
3. RAINBOW CHALCEDONY.							Chalcedonius Griseo Cærulescens. W.
Small masses	soft	heavy	botryoide	BLUEISH GREY	red, green, yellow rainbows	East Indies	toys.
4. MILK CHALCEDONY.							Chalcedonius Cochelong Cronstedt.
Great lumps	soft	heavy	scaly	MILKY	thin clouds of grey	Tartary	for idols.

5. BLUE CHALCEDONY.								Chalcedonius Cæruleus Cronstedt.
Large lumps	hard	heavy	wavy	GREYISH BLUE	unspotted	Ceylon, Siberia	ornament.	
6. LINEATED CHALCEDONY.								Chalcedonius Lineatus. W.
Large lumps	hard	heavy	warted	YELLOWISH	lines and spots of all colours	East Indies	ornament.	

COMPOUND FOSSILS.

ORDER V.

CARNELIANS.

Tolerably pellucid, pure, or veined in circles, not in beds.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. RED CARNELIAN.							Silex Carneolus. L.
Large lumps	hard	heavy	crusted	PALE RED	without veins	Arabia	toys.
2. WHITE CARNELIAN.							Carneolus Albescens. W.
Large lumps	hard	heavy	smooth	MILKY WHITE	cloudy	Ægypt	toys.
3. YELLOW CARNELIAN.							Carneolus Flavescens Cronstedt.
Small masses	tender	heavy	warted	AMBER-COLOUR'D	dusky	Ægypt	toys.
4. BROWN CARNELIAN.							Carneolus Flavofuscus Cronstedt.
Small lumps	hard	heavy	crusted	PURE BROWN	cloudy	Siberia	toys.

5. BLOODY CARNELIAN.								Beryllus Scheukzer. W.
Small lumps	very hard	heavy	ſmooth	DEEP RED	clear	Eaſt Indies	a jewel.	
6. DOTTED CARNELIAN.								Carneolus Stigmites. W.
Small lumps	very hard	heavy	warted	WHITISH RED	ſpots of blood red	Eaſt Indies	ornament.	
7. VEINY CARNELIAN.								Carneolus Lineatus. W.
Small lumps	tender	light	ſmooth	PALE RED	veins of deep red	Arabia	ornament.	

D.

COMPOUND FOSSILS.

ORDER VI.

AGATES.

Clear, hard, veined, flinty, and rugged on the surface.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. GREY AGATE.							Achates Duriſima. W.
Large lumps	very hard	heavy	raiſed in round bumps	GREY	veins of black and white	Germany	for toys.
2. BROWN AGATE.							Achates Fuſca. W.
Small lumps	very hard	very heavy	warted	DEEP BROWN	vein'd with grey and white	Italy	for toys.

3. MILK AGATE.								Achates Chalcedonizans Crantiedi.
Large lumps	hard	heavy	raised in lumps	MILKY GREY	concentric circles of white	Africa	for toys.	
4. BLACK AGATE.								Achates Niger. W.
Small lumps	hard	very heavy	botryoide	BLACK, WITH PALE VEINS	keeps its colour in the fire	Germany	toys.	
5. DOTTED AGATE. ST. STEPHEN'S GEM.								Silex Sardus. L.
Small masses	soft	very heavy	rough	PALE GREY	red dots, and streaky	Italy	toys.	
6. TAWNY AGATE.								L'Agate Leonine. W.
Large lumps	hard	heavy	botryoide	PALE BROWNISH YELLOW	undulated	Germany	toys.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
7. HYENA AGATE.								L'Agate Hyane. W.
Large lumps	hard	heavy	rugged	OLIVE BROWN	ſmoaky	Germany	toys.	
8. PANTHER AGATE.								L'Agate Peurthere. W.
Large lumps	very hard	heavy	grape like	YELLOWISH	duſky ſpots	Palatinate	toys.	
9. WHITE VEIN'D AGATE.								Achates Variegatus Cronſtedt.
Large maſſes	very hard	heavy	bubbly	DEEP BROWN	white veins	Hartz foreſt	toys.	
10. VIOLET AGATE.								Achates Violaceus Cronſtedt.
Small lumps	hard	heavy	warted	VIOLET PURPLE	duſky veins	Germany	toys.	

11. BLOOD AGATE.								Achates Hæmachate. W.
Small lumps	ſoft	heavy	bumps, and riſings	BLACK	blood red ſpots	Germany	toys.	
12. FLESH AGATE.								Achates Sardachates. W.
Small lumps	hard	heavy	waved	GREY	fleſh-colour'd ſpots	Oberſtein	toys.	
13. GREEN AGATE.								Achates Jaſpachates. W.
Large lumps	ſoft	heavy	warted	PALE GREEN	red ſpots	Germany	toys.	
14. ORANGE AGATE.								Achates Quadricolor. W.
Large lumps	hard	very heavy	cruſted, and rough	DUSKY YELLOW	black, red, and green veins	Germany	toys.	

COMPOUND FOSSILS.

ORDER VII.

MOCOAS.

Semipellucid, ſmooth, very hard, with black delineations.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CLEAR MOCOA.							L'Agate Coralline. W.
Small lumps	very hard	heavy	ſmooth	COLOUR-LESS	with black moſſes	Eaſt Indies	ornament.
2. BROWN MOCOA.							Dendrachates Woodward.
Small lumps	hard	heavy	uneven	PALE BROWN	figures of trees	Eaſt Indies	ornaments.

3. WHITE MOCOA.							Achates Mocoensis. W.
Small lumps	hard	heavy	botryoide	WHITISH, OR MILKY	forms of silver ores	Germany *	ornament.

* Wonders have been related of these Mocoas; but they have been fictitious: we have been astonished with the forms of sun, moon, and stars; the shapes of Insects, the arms of nations, and, even human figures: but when we know that a solution of silver will follow a tool, and give any delineations we please on Stones, of this quality, we find the origin of these more than natural productions. Mocoas may be made thus, with pretty figures, like the natural, as well as with romantic follies; and 'tis strange, that when the lines decay, and begin to disappear, laying the Stone in the sunshine recalls them.

Linnæus does not distinguish the Mocoa from the Agate; and Wallerius enumerates those with forms of crowns, and human figures, and the like: but the fact is, the Mocoa differs from the Agate; for it is harder; but the colours of the Stone, not the delineations, are to mark the different kinds.

COMPOUND FOSSILS.

ORDER VIII.

SWALLOW STONES.

Small, rounded, or oval, smooth.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CONVEX SWALLOW STONE.							Hirondelle Concave. W.
Low raiſed	tender	heavy	poliſhed	PALE BROWN	concave below	Germany	
2. HIGH SWALLOW STONE.							Hirondelle Demiſphærique. W.
Raiſed high	hard	heavy	botryoide	WHITISH	hæmi-ſphere	Saxony	
3. CRAB'S EYE SWALLOW STONE.							Hirondelle Ovale. W.
Oval	hard	heavy	poliſhed	GREY	in lumps of Agate	Germany	
4. CORNER'D SWALLOW STONE.							Hirondelle Quarré. W.
Square	ſoft	light	rugged	MILKY	hollowed below	Germany	

COMPOUND FOSSILS.

ORDER IX.

JASPERS.

Opake, rough, in vaſt maſſes.

1. PLAIN JASPERS.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. GREY JASPER.								
Vaſt maſſes	hard	very heavy	rugged	DULL GREY	breaks like flint	Sweden		Silex Jaſpis. L.
2. WHITE JASPER.								
Great maſſes	very hard	heavy	uneven	FINE BLUEISH WHITE	poliſhes finely	Germany		Petroſilex Albus. W.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
3. RED JASPER.							
Great pebbles	hard	heavy	even	RED	glossy	gravel pits in England	Homochroum Rubens. H.
4. YELLOW JASPER.							
Vast blocks	very hard	heavy	rugged	PALE YELLOW	sparkling	Hampstead-heath	Jaspis Flava. W.
5. IRON JASPER.							
Rounded lumps	hard	very heavy	smooth	BRIGHT IRON GREY	flinty	Germany	Jaspis Martialis Cronstedt.
6. BROWN JASPER.							
Rugged lumps	very hard	very heavy	wrinkled	DEAD BROWN	shining	Sweden	Jaspis Spadicea. W.

7. BLUE JASPER.							Jaſpis Aerizuſa Plin. i.
Rounded lumps	hard	very heavy	gloſſy	FINE BLUE	flinty	Italy	
8. GREEN JASPER.							Homochroum Vireſcens. H.
Rounded lumps	hard	heavy	ſmooth	DULL GREEN	marbly	Suſſex	
9. BLACK JASPER.							Jaſpis Nigra Cronſtedt.
Vaſt rocks	very hard	heavy	uneven	PERFECTLY BLACK	ſtony	Germany, Sweden	
2. VEIN'D JASPERS.							
10. GREEN AND YELLOW JASPER.							Jaſpis Virens Cronſtedt.
Small maſſes	hard	very heavy	ſmooth	GOOD GREEN	yellow ſpots	Bohemia	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
11. BLOODSTONE JASPER.							Jaſpis Heliotropium Cronſtedt.
Small lumps	hard	heavy	ſmooth	BLUEISH GREEN	blood red ſpots	Ægypt	
12. YELLOW AND WHITE JASPER.							Jaſpis Variegata Albeſcens. W.
Great blocks	very hard	heavy	crack'd, and flaw'd	PEARLY WHITE	yellow blotches	Germany	
13. RED AND BLACK JASPER.							Diaſpro Roſſo Cronſtedt.
Large lumps	hard	very heavy	raiſed in bumps	BLOOD RED	green and black ſpots	Italy	
14. RED AND YELLOW JASPER.							Diaſpro Florido Cronſtedt.
Small blocks	very hard	heavy	perfectly even	DUSKY RED	yellow veins and ſpots	Ægypt	

15. BROWN AND WHITE JASPER.								Jaſpis Variegata fuſca. W.
Large lumps	hard	very heavy	uneven	PALE BROWN	white blotches	Germany		
16. PANTHER JASPER.								Jaſpis Variegate Viridis. W.
Great lumps	leſs hard	heavy	uneven	GREEN	yellow and red blotches	Germany		
17. GARAMANTINE JASPER.								Jaſpis Lineis Albis. W.
Small lumps	very hard	heavy	gloſſy	DEEP RED	white blotches	Ægypt		
18. AZURE JASPER.								Lapis Lazuli. W.
Small lumps	hard	heavy	crack'd	FINE BLUE	yellow and white veins and ſpots	Arabia	a copper ore.	

FORM.	HARDNESS.	WEIGHT.	SURFACE.	COLOUR.	QUALITIES.	PLACE.	USES.	
19. ARMENIAN JASPER.								Lapis Armenus. W.
Small masses	less hard	heavy	smooth	LIGHT BLUE	white spots	Ægypt		
20. SAPPHIRINE JASPER.								Lapis Radians. W.
Small masses	hard	heavy	glossy	DEEP BLUE	gold dots	East Indies		
3. ROCK JASPERS.								
21. BROWN ROCK JASPER.								Petrosilex Lucidofuscus. W.
Whole strata	hard	very heavy	rugged	PALE BROWN	flinty	Germany		
22. UMBER ROCK JASPER.								Petrosilex Obscurofuscus. W.
Whole rocks	tender	heavy	wavy	DEEP BROWN	glassy	Sweden		

23. VEIN'D ROCK JASPER.								Petrofilex Venosus. W.
Vast rocks	hard	heavy	rugged	GREENISH	brown veins	Germany		
24. SAND JASPER.								Petrofilex Arenaceus. W.
Vast masses	less hard	very heavy	rough	RUDDY BROWN	white and yellow dots	Italy		
4. AGATE JASPERS.								
25. PEARLY AGATE JASPER.								Petrofilex Semipellucidus. Albus. W.
Great rocks	very hard	very heavy	rugged	WHITISH	white lines	Germany		
26. RED AGATE JASPER.								Petrofilex Semipellucidus Rubescens. W.
Great masses	hard	heavy	uneven	PALE REDDISH	dusky spots	Germany		

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
27. VEIN'D AGATE JASPER.							
Great maſſes	very hard	heavy	ſmooth	BROWNISH	white and red veins	Bohemia	Petroſilex Semipellucidus Venoſus. W.
28. PEACOCK AGATE JASPER.							
Great blocks	leſs hard	very heavy	bubbled	RUDDY	black and yellow veins	Germany	Petroſilex Semipellucidus Variegatus. W.

COMPOUND FOSSILS.

ORDER X.

PEBBLES.

Rounded, hard maſſes, covered with a cruſt, and formed of circular coats, round a central nucleus.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. RED AND WHITE PEBBLE.							Calculus Albo Rubens. H.
Oval	hard	heavy	rugged	NUCLEUS YELLOW	crusts red and white	Hampstead-heath	
2. BLACK AND WHITE PEBBLE.							Calculus Nigro Albus. H.
Round	hard	heavy	uneven	NUCLEUS TAWNY	crusts black, white, yellow	Kensington	
3. BROWN AND WHITE PEBBLE.							Calculus Fusco Albus. H.
Oblong	hard	heavy	reticu-lated	LARGE BROWN NUCLEUS	crusts white and brown	Hertford-shire	
4. BLUE AND RED PEBBLE.							Calculus Cærulco Rubens. H.
Round	hard	heavy	smooth	LARGE GREY NUCLEUS	red, blue, and brown crusts	Windsor	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. WHITE COATED PEBBLE.							Calculus Corticosus. H.
Uneven masses	hard	heavy	rugged	RED, WHITE, AND BROWN	a thick white crust	Hampstead	
6. BLUSH AND WHITE PEBBLE.							Calculus Rosaceus. H.
Round	hard	heavy	wrinkled	NUCLEUS BLUEISH	thin crusts of two reds, white and yellow	Hertfordshire	
7. PURPLE PEBBLE.							Calculus Purpurascens. H.
Oval	hard	heavy	smooth	NUCLEUS FLESH-COLOUR'D	crusts purple and yellow	Hampstead	
8. MAGPYE PEBBLE.							Calculus Maculatus. H.
Oval	hard	heavy	wrinkled	NUCLEUS BLACK	crusts black and white	Leicestershire	

9. GREEN AND WHITE PEBBLE.							Calculus Albo Virens. H.
Round	hard	heavy	uneven	NUCLEUS GREY	crusts white and green	Northamptonshire	
10. RAINBOW PEBBLE.							Calculus Verticolor. H.
Round	hard	heavy	smooth	NUCLEUS SMALL AND RUDDY	thin crusts of all colours	Leicestershire	
11. ÆGYPTIAN PEBBLE.*							Calculus Ægyptiacus. H.
Oblong	hard	heavy	wrinkled	NUCLEUS BROWNISH WHITE	crusts tawny, brown, and black	Ægypt	
12. BROWN AND YELLOW PEBBLE.							Calculus Fuscoflavus. H.
Oval	hard	heavy	smooth	NUCLEUS GREEN	crusts brown and yellow	Hampstead	

* The Ægyptian Pebble is eminent for its Mecoa-like variegations; and for the more than ordinary oddities of its veins and spots. Few Fossils require more care in the distinction than the English Pebbles. I once thought them more numerous; but these seem, on strict enquiry, all the true kinds.

COMPOUND FOSSILS.

ORDER XI.

FLINTS.

Opake, glossy, solid, and of one colour and substance.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. CHALK FLINT.							Silex Cretacus. L.
Uneven masses	very hard	heavy	rough, white coated	DUSKY	horn-like	chalk-pits	gun flints, and glass.
2. OIL FLINT.							Silex Pyromachus. L.
Great lumps	hard	heavy	naked, and smooth	OLIVE-COLOUR'D	oily	France	gun flints.
3. GREY FLINT.							Silex Marmoreus. L.
Vast lumps	very hard	heavy	smooth, brown coated	GREY	glossy	Sweden	gun flints.

COMPOUND FOSSILS.

CLASS II.

STONES.

Formed into whole ſtrata; compoſed of two, or more of the native earthy Foſſils.

ORDER I.

EARTHY STONES.

Compoſed of hardened Earths, with Saline, or other mixtures.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. OIL STONE.								
Thick plates	ſoft	heavy	ſmooth	BLACK	fine	Germany	for whetſtones.	* Schiſtus Novacula. L.
2. SLATE STONE.								
Thin plates	hard	heavy	ſcaly	RAVEN GREY	eaſily mark'd	Germany	ſlates for writing.	Schiſtus Tabularis. L.
3. BRITTLE SLATE.								
Thick plates	tender	light	duſty	BLACK	crumbly	Sweden		Schiſtus Atratus. L.
4. GREEN SLATE.								
Coarſe plates	ſoft	heavy	rugged	GREYISH GREEN	brittle	Germany		Schiſtus Viridis. L.

5. BLUE SLATE.							Schiſtus Ardeſia. L.
Fine plates	hard	heavy	even	BLUE GREY	firm	England	for ſlating houſes.
6. PURPLE SLATE.							Schiſtus Purpuraſcens. H.
Thick plates	hard	light	ſcaly	PURPLE	brittle	England	for houſes.
7. SOUNDING SLATE.							Schiſtus Solidus. L.
Fine plates	very hard	heavy	ſmooth	BLACK	ſounds when ſtruck	England	for houſes.
8. CLAY SLATE.							Schiſtus Argillaceus. L.
Thick ſtrata	ſoft	light	rugged	YELLOWISH GREY	crumbly	Sweden	

* Excellent Linnæus! ſo diſtinct and perfect in theſe Stones, little remains for others, but to copy him.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
9. WHITE MARLE SLATE.							Schistus Albus. H.
Vast strata	very soft	light	scaly	PURE WHITE	shattery	England	manure.
10. GREY MARLE SLATE.							Schistus Margaceus. α L.
Thick beds	soft	heavy	uneven	DEAD GREY	crumbly	England	manure.
11. GREEN MARLE SLATE.							Schistus Margaceus. β L.
Deep strata	hard	heavy	rugged	GREENISH	breaks in the air	England	manure.
12. RUDDY MARLE SLATE.							Schistus Margaceus. γ L.
Thick strata	very hard	heavy	scaly	REDDISH	breaks in the air	England	manure.

13. STAINING SLATE.								Schistus Nigrica.
Coarse beds	soft	light	flaky	DEEP BLACK	stains the hands	Sweden	a coarse paint.	
14. RAVEN SLATE. ALUM SLATE.								Schistus Communis. L.
Thick strata	hard	heavy	scaly	RAVEN GREY	firm	England	alum ore.	
15. DOTTED SLATE.								Schistus Olearius. L.
Thick strata	hard	heavy	rugged	RUDDY	brown spots*	Sweden	whetstones.	
16. LIMESTONE SLATE.								Schistus Effervescens. L.
Vast strata	hard	heavy	scaly	PALE BROWN	gritty	Sweden	lime.	
17. FLINTY SLATE.								Schistus Compactissimus. L.
Thick plates	very hard	very heavy	flaky	DARK GREY	compact	China		

* This often is rich in Alum; in which case it breaks into a kind of rhomboidal fragments, with sparkling surface.

COMPOUND FOSSILS.

ORDER II.

CRYSTALLINE STONES.

Compoſed of a cryſtalline matter; debaſed by earthy, and other mixtures.

THE diſtinction of theſe Stones is eaſy, and abſolute: they are hard; they are gloſſy, when broken; they ſtrike fire with ſteel; they are not affected by Acids; and they run to glaſs.

Where we ſee cracks, or hollows, in them, they are uſually lined, or filled with ſhoots of pure Cryſtal; and of Cryſtal only. Spar has no place but in Sparry Stones.

1. GRIND-

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.	
1. GRINDSTONE.								
Thick ſtrata	hard	heavy	rugged	WHITISH	ſandy	Germany	for grindſtones.	Cos Cotaria. L.
2. CRACK STONE.								
Vaſt ſtrata	ſoft	heavy	crack'd	GREYISH	ſpangled	Sweden		Cos Quadrum. L.
3. LIVER STONE.								
Vaſt maſſes	tender	heavy	rugged	REDDISH BROWN	bounces in the fire	Sweden		Cos Calcarea. L.
4. TYGER STONE.								
Great maſſes	hard	heavy	uneven	RUDDY BROWN	white ſpots	Sweden		Cos Tigrina. L.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
5. IRON STONE.							Cos Variolosa. L.
Rude lumps	ſoft	lighter	bubbly	PALE BROWN	round ruſty ſpots	Germany	an iron ore.
6. HONE STONE.							Cos Novacula. L.
Flat lumps	ſoft	heavy	ſmooth	PALE YELLOWISH BROWN	ſmooth	Arabia	for barbers hones.
7. WHITE SLATE STONE.							Cos Fiſſilis. L.
Flat flakes	hard	heavy	rugged	WHITISH	ſandy	England	for building.
8. RED SLATE STONE.							Cos Fiſſilis Ruſeſcens. L.
Thick plates	tender	very heavy	ſcaly	REDDISH	gritty, ſparkling	England	for building.

9. CRUMBLY STONE.								Friab..... L.
Vaſt ſtrata	ſoſt	heavy	rugged	PALE	hardens in the air	England	building.	
10. LOOSE STONE.								Cos Coagmentata. L.
Great lumps	brittle	heavy	gritty	BRIGHT	of ſmall, clear granules	Italy	glaſs.	
11. FILTERING STONE.								Cos Filtrum. L.
Thick lumps	tender	light	cavernous	PALE BROWN	lets water paſs thro'	Canaries	for filtering water.	
12. SMOOTH STONE.								Cos Compacta.
Thick ſtrata	very hard	heavy	ſmooth	YELLOWISH BROWN	granite dots	Germany, Sweden	grinding ſtones.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
13. BRIGHT STONE.							Cos Strataria. L.
Vaſt ſtrata	hard	heavy	regularly granulated	PALE BROWN	bright	England, Sweden	building.
14. YELLOW SAND STONE.							Cos Colorata. α L.
Great ſtrata	tender	heavy	ſandy	YELLOW	even ſtructure	Yorkſhire	
15. GREEN SAND STONE.							Cos Colorata. β L.
Vaſt maſſes	ſoft	very heavy	rugged	DULL GREEN	granulated	Germany	refuſe.
16. BLACK SAND STONE.							Cos Colorata. γ L.
Great lumps	tender	heavy	uneven	BLACKISH	coarſe	Sweden	refuſe.

17. PORCELANE STONE.								Cos Porcellana. L.
Thick ſtrata	hard	heavy	irregular	GREY	part gloſſy	Sweden		
18. MILL STONE.								Cos Molaris. L.
Vaſt ſtrata	hard	heavy	irregular	PALE BROWN	mixt of various particles	England	for grinding corn.	
19. ROUGH STONE.								Cos Fundamentalis. L.
Vaſt ſtrata	very hard	heavy	granulated	RUDDY	ſharp particles	Sweden	building.	

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
20. WHITE STONE.							Cos Fundamentalis Alba. L.
Vaſt ſtrata	hard	heavy	rough	WHITISH	ſharp particles	England	building.
21. PLATE STONE.							Quartzum Fiſſile. L.
Great lumps	very hard	heavy	ſmooth	PALE GREY	flinty, but granulated	Germany	glaſs.
22. SLAG STONE.							Quartzum Cotaceum. L.
Vaſt blocks	hard	very heavy	rugged	PALE BROWN	mixt of great and ſmall grains	Sweden	glaſs.

COMPOUND FOSSILS.

ORDER III.

SPARRY STONES.

Compoſed of Spar; debaſed by earthy, and other mixtures.

THESE are ſoft, tender, and brittle; they break irregularly; they will not ſtrike fire with ſteel; and they ferment with Acids. The pure Spar in their conſtruction, diſſolves in theſe liquors; and ſometimes part of the debaſing mixture, when Alkaline: the reſt remains, and ſhews the mixt nature of the Stones.

'Tis from theſe reſiduums of the various Sparry Stones, waſhed clean, and examined by the microſcope, we may, with truth and certainty, diſcover their nature and compoſition.

The cracks in theſe rocks always afford Spar, never Cryſtal; therefore theſe cryſtalizations are of matter which was originally a part of the Stone itſelf, not brought from elſewhere.

The coarſer Sparry Stones have been called, Limeſtone; and the finer Marbles. The diſtinctive names ſhall be preſerved here, tho' the diſtinction itſelf is vague. I have had ſome of our Limeſtones poliſhed, as Marble, which all have call'd, and allowed to be Marble; and many Marbles always called ſo, and acknowledged ſuch, are burnt into lime; eſpecially the fragments, and the upper parts of the ſtrata.

In all Limeſtones, Marbles, and even in Chalk, the upper part is ſofter, and coarſer; that which lies deeper, is harder, and finer.

COMPOUND FOSSILS.

I. LIMESTONES. *

Sparry Stones of a dull aſpect.

1. OF A SMOOTH EVEN STRUCTURE.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
1. WHITE SMOOTH LIMESTONE.							Lapis Calcareus Æquabilis Albus. W.
Great ſtrata	tender	heavy	uneven	WHITISH	burns eaſily to lime	England	lime. manure.
2. YELLOW SMOOTH LIMESTONE.							Calcareus Æ. Flavus Cronſtedt.
Vaſt maſſes	hard	heavy	ſmooth	PALE YELLOW	burns ſlowly	Venice	lime.

3. RUDDY SMOOTH LIMESTONE.							Calcareus Æ. Rubens. W.
Thick ſtrata	tender	light	rough	REDDISH BROWN	brittle	Sweden	lime.
4. RUSTY SMOOTH LIMESTONE.							Calcareus Ferrugineus Cronſtedt.
Thin ſtrata	hard	heavy	flaky	RUST COLOUR'D	gloſſy	Germany	lime.
5. GREY SMOOTH LIMESTONE.							Calcareus Griſeus Cronſtedt.
Vaſt maſſes	hard	light	rugged	BLUEISH GREY	firm	England	lime. manure.
6. GREEN SMOOTH LIMESTONE.							Calcareus Æ. Viridis. W.
Thick ſtrata	very hard	heavy	irregular	GREENISH	burns quick	Prague	lime.

Hh 2

* Here Cronſtedt takes the lead, as Linnæus did in the preceding Order of the Cryſtalline Stones; the great Swede, not allowing the mineraliſts diſtinction, as of Species, but accounting them Varieties. 'Tis thus the Student in this abſtruſe ſcience ſhould act, always ſelecting the names of that author, who has been moſt diſtinctive; and adding, and reforming from his own ſtore.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
7. IRON SMOOTH LIMESTONE.							Calcareus Æ. Ferreus. W.
Large ſtrata	ver y hard	very heavy	undulated	GLOSSY, IRON GREY	burns ſlowly	Germany	lime.
8. BROWN SMOOTH LIMESTONE.							Calcareus Æ. Fuſcus. W.
Great lumps	hard	heavy	rugged	DEEP BROWN	burns difficultly	Dalecarlia	lime.
9. BLACK SMOOTH LIMESTONE.							Calcareus Niger Cronſtedt.
Vaſt ſtrata	ſoft	light	ſmooth	BLACKISH	burns eaſily	Germany	lime.
10. MARBLED SMOOTH LIMESTONE.							Calcareus Æ. Venoſus. W.
Thick ſtrata	very hard	heavy	flaky	grey, ruddy, and other colours, mixed	bright	Germany	lime.

2. GRITTY LIMESTONES.

11. COARSE WHITE GRITTY LIMESTONE.								Calcareus Granulatus Alb. 1. Cronſtedt.
Vaſt ſtrata	tender	light	granulated	DEAD WHITE	large grains	England		lime. manure.
12. FINE WHITE GRITTY LIMESTONE.								Calcareus Granulatus Alb. 2. Cronſtedt.
Great lumps	hard	heavy	rough	BRIGHT WHITE	ſmall grains	Sweden		lime.
13. BRIGHT GRITTY LIMESTONE.								Calcareus Scintillans Cronſtedt.
Irregular ſtrata	brittle	light	duſty	SHINING WHITE	ſulphureous ſmell	Italy		for brimſtone.
14. RED GRITTY LIMESTONE.								Calcareus Granulatus Ruber Cronſtedt.
Thick ſtrata	hard	heavy	rugged	REDDISH	crackly	England		lime.

Form.	Hardness.	Weight.	Surface.	Colour.	Qualities.	Place.	Uses.
15. GREEN GRITTY LIMESTONE.							Calcareus Granulatus Virescens. W.
Thin ſtrata	tender	light	irregular	DARK GREEN	burns eaſily	Germany	lime.
16. BLACK AND WHITE GRITTY LIMESTONE.				MARBLED, OF BLACK, WHITE, AND BROWN			Calcareus Granulatus Nigro Albeſcens Cronſtedt.
Thick beds	hard	heavy	undulated		burns ſlowly	Salberg	lime.
17. GREEN AND WHITE GRITTY LIMESTONE.							Calcareus Granulatus Albo Viridis Cronſtedt.
Rude lumps	tender	heavy	rugged	WHITE, AND GREEN	blotch'd	Salberg	lime.
3. FLAKY LIMESTONES.							
18. WHITE FLAKY LIMESTONE.							Calcareus Squammoſus Albus Cronſtedt.
Vaſt maſſes	hard	light	rugged	SNOW WHITE	thick flakes	Sweden	lime.